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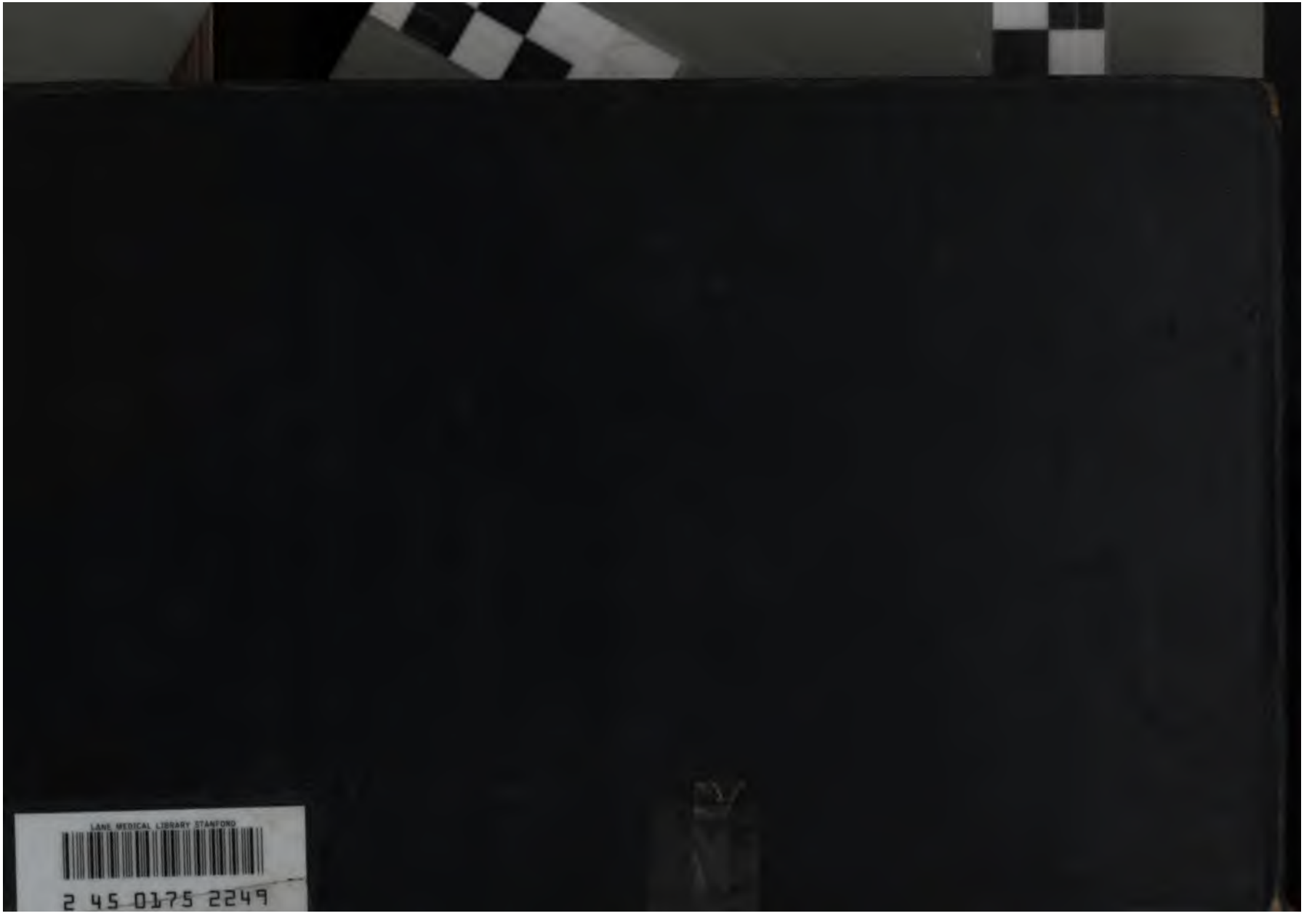
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PRIMARY MALIGNANT GROWTHS OF THE LUNGS AND BRONCHI

PRIMARY MALIGNANT GROWTHS OF THE LUNGS AND BRONCHI

A PATHOLOGICAL AND CLINICAL STUDY

BY

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'Oportet omnia signa contemplari'

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TO

MY OLD-TIME TEACHER AND FRIEND

HIS EXCELLENCY

GEH. RAT. PROF. DR. JULIUS ARNOLD

IN HEIDELBERG

IN GRATITUDE AND AFFECTION

27866

PREFACE

I HAD intended that this little monograph on lung tumors should be handed to Professor Arnold on the occasion of the festival held August 19, 1905, to celebrate the seventieth birthday of the master. The plan as originally conceived could not be carried out, but it is hoped that the delay in bringing out the work may not have been altogether valueless in that it made possible a considerable increase in the volume of the material. Great thanks are due to my friends and assistants, Dr. O. Hensel and Dr. O. F. Krehbiel, for their indispensable aid in collecting and sifting the material. I am greatly indebted, as well, to Miss Laura E. Smith, of the Library of the New York Academy of Medicine. I wish also to express my sincere thanks to Dr. H. S. Tienken for her untiring interest, unselfish devotion, and technical skill in the proper recording and tabulating of the material, and to Dr. A. L. Garbat and to Miss F. H. Fiske for the strenuous work of seeing it through the press. Finally, I would acknowledge my debt to Dr. F. S. Mandlebaum of New York and to Professor S. B. Wolbach of Boston for the very beautiful photographs used here as illustrations.

The author dares to hope for kindly criticism and some renewed interest in the subject.

I. ADLER

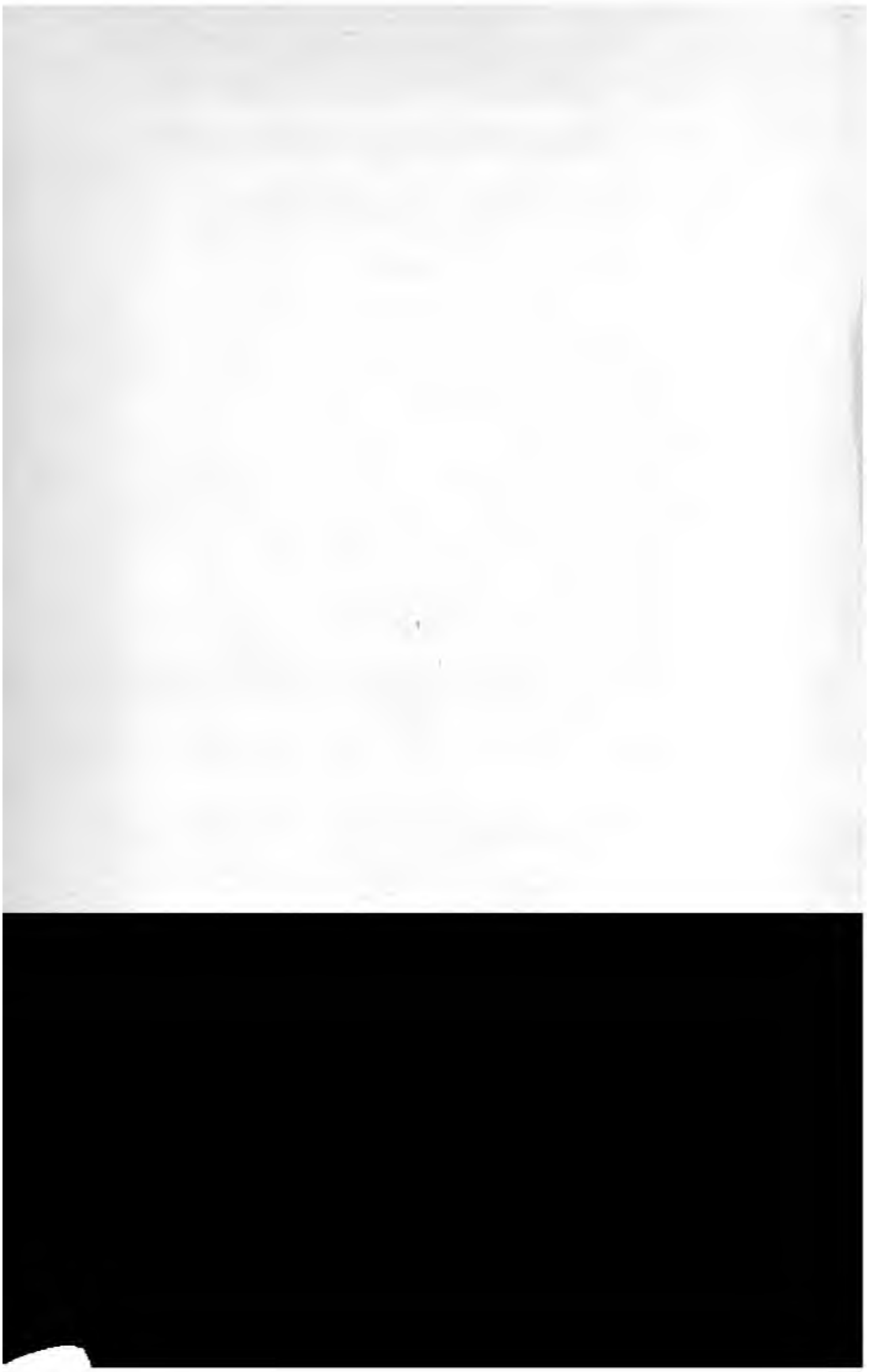
NEW YORK, *Christmas*, 1911

CONTENTS

CHAPTER		PAGE
I.	INTRODUCTORY *Mostly statistical.*	3
II.	INTRODUCTORY (*Continued*) *Remarks on Plan of Monograph.*	13
III.	A FEW HISTORICAL NOTES *The Precancerous Influences.*	16
IV.	PRECANCEROUS INFLUENCES (*Continued*) *Etiology of Malignant Tumors — Relation of Tuberculosis to Lung Tumors.*	26
V.	PATHOLOGY *Gross Appearance of Lung Tumors — A Minute Study of Sarcoma and Carcinoma.*	39
VI.	PATHOLOGY (*Continued*) *Histogenesis of Carcinoma — Endothelioma.*	55
VII.	PATHOLOGY (*Continued*) *Metaplasia.*	62
VIII.	CLINICAL	68
IX.	CLINICAL (*Continued*)	86
APPENDICES		110

TABLES

I.	CARCINOMA	114
II.	SARCOMA	240
III.	DOUBTFUL	278
IV.	MISCELLANEOUS	314



LIST OF ILLUSTRATIONS

[THE PLATES NUMBERED I TO XVI ARE AT THE END OF THE VOLUME]

FRONTISPIECE.—Section of lung, showing a large tumor originating from the root and destroying the greater part of lung. Communicating cavities and tumor nodules of varying sizes. That portion of lung not infiltrated with tumor, compressed and pushed backward towards the spine. (From a drawing by H. BECKER.)

PLATE I.—Transverse section across an infiltrating tumor and adjoining lung. Tumor area sharply defined against lung tissue. Infiltration so dense and complete that only a few vessels and slightly dilated bronchi are visible as remnants of normal structure. (From a drawing by H. BECKER.)

PLATE II.—Shows destruction of almost entire lung. Pulmonary tissue almost completely replaced by tumor. (From a drawing by H. BECKER.)

PLATE III.—Section of medullary carcinoma illustrating the occasional impossibility of differentiating between carcinoma and sarcoma.

PLATE IV.—Same section as preceding, photographed with high power, exhibiting the same indeterminate character.

PLATE V.—Section from another portion of the same tumor as shown in Plate IV. In structure and in character of cells plainly suggesting carcinoma.

PLATE VI.—Shows section through kidney from same case. An incipient metastatic deposit, consisting of a few genuine epithelial cells just entering Bowman's Capsule, is shown.

PLATE VII.—Typical picture of ordinary form of carcinoma. A large alveole is seen, directly injecting a lymph-vessel with cancerous cells.

PLATE VIII.—Rapidly proliferating carcinoma, suggesting glandular type. Very little stroma between the alveoles, which latter contain mostly flat and cuboidal epithelial cells.

PLATE IX.—Same form of carcinoma. Smaller and more plexiform alveolar structure, more voluminous stroma, injection of lymph-spaces and lymph-vessels from alveoles.

PLATE X.—Cancroid with characteristic horny epithelial nests.

PLATE XI.—Cylindrical-celled carcinoma, the epithelium not ciliated. Alveolar structure, alveoles varying largely in size. Much mucoid degeneration. Origin from bronchial mucous glands.

PLATE XII.—Same type of tumor. To the right, dilated bronchus. In middle bronchial mucous glands, transition to carcinomatous alveoles plainly seen.

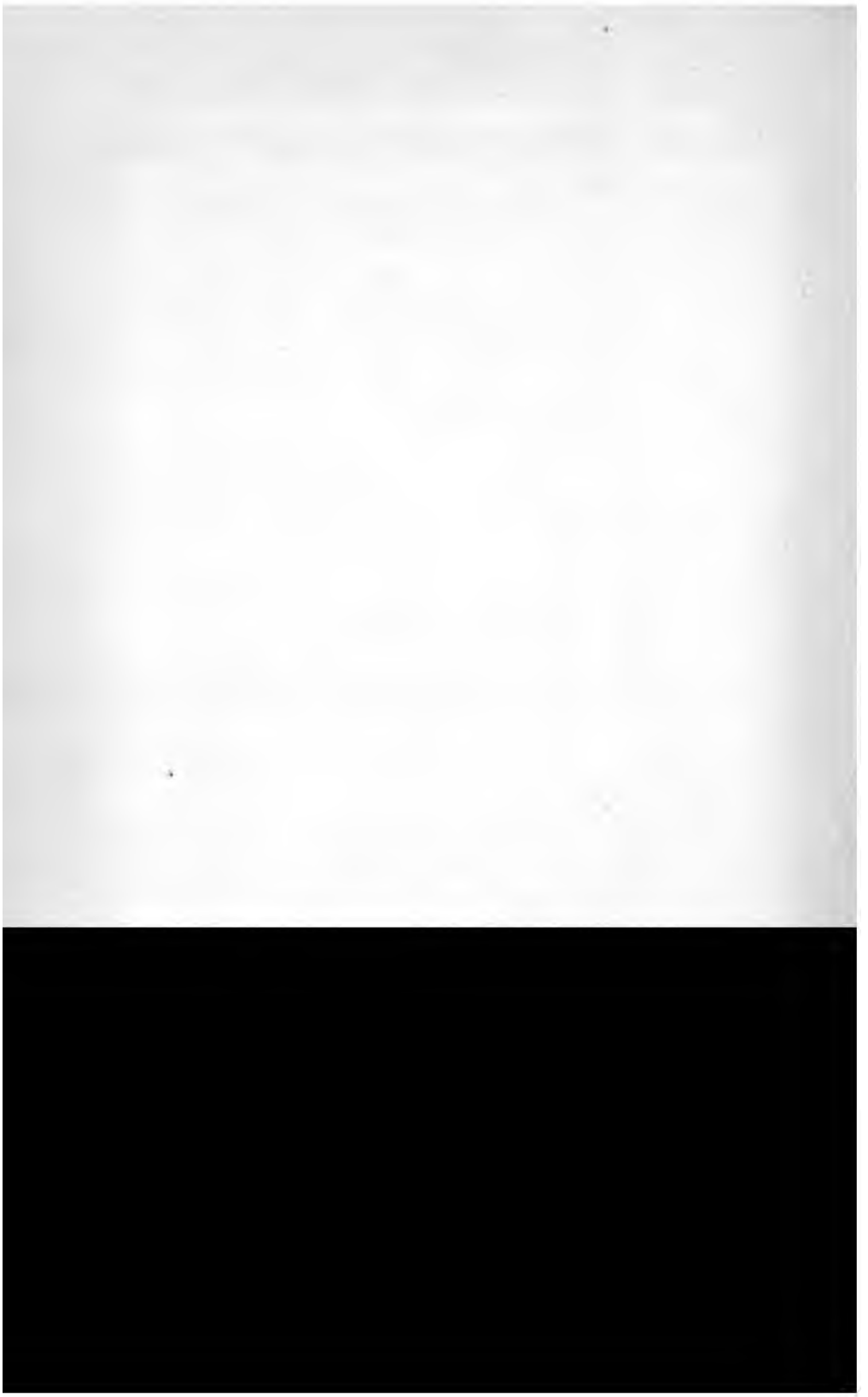
PLATE XIII.—Similar type of tumor. Shows partial destruction of bronchial cartilage and various transitions from normal bronchial mucous glands to cancerous alveoles.

PLATE XIV.—Cylindrical-celled carcinoma. Suggestions of alveolar structure. Striking papillary arrangement.

PLATE XV.—Besides alveolar structure, shows marked participation of lymph-vessels and spaces in the cancerous proliferation.

PLATE XVI.—Shows practically only affection of lymphatic apparatus. Both this plate and the one preceding represent sections taken from tumors which in other localizations show typical carcinomatous structure.

PRIMARY MALIGNANT GROWTHS OF THE LUNG



PRIMARY MALIGNANT GROWTHS OF THE LUNG

CHAPTER I

INTRODUCTORY

IS it worth while to write a monograph on the subject of primary malignant tumors of the lung? In the course of the last two centuries an ever-increasing literature has accumulated around this subject. But this literature is without correlation, much of it buried in dissertations and other out-of-the-way places, and, with but a few notable exceptions, no attempt has been made to study the subject as a whole, either the pathological or the clinical aspect having been emphasized at the expense of the other, according to the special predilection of the author. On one point, however, there is nearly complete consensus of opinion, and that is that primary malignant neoplasms of the lungs are among the rarest forms of disease. This latter opinion of the extreme rarity of primary tumors has persisted for centuries. Within the last few decades attempts have been made to combat this dogma, but even now the overwhelming majority of medical practitioners rarely, if ever, think of a diagnosis of tumor of the lungs, and the ubiquitous tuberculosis, with its multiform clinical appearances and its plastic adaptation to all ages and all conditions of mankind, is ever ready to furnish, to all but a very few, a comfortable and satisfactory diagnosis.

Most textbooks hardly notice lung tumors, and if they give the subject any consideration it is, for the most part, insufficient. Thus the well-known and still authoritative textbook on Diseases of the Lungs and Pleuræ, including Tuberculosis and Mediastinal Growths, by Sir R. Douglas Powell and

P. Horton-Smith Hartley (5th Edition, 1911), while treating at length of thoracic tumors and of mediastinal tumors, etc., has scarcely more than one page to cover the entire subject of carcinoma and sarcoma of the lungs. The excellent book of A. Fränkel [1] and the admirable chapters on carcinoma of the lungs in the latest edition of Wolff,[2] as well as a few other publications,[3] attempt a more comprehensive presentation of this type of tumor, but they seldom get into the hands of the medical public at large, and so it happens that the general practitioner is not in a position to diagnosticate a primary lung tumor as often as might be, and the belief in the extreme rarity of these cases is still maintained. To add to these difficulties, even the diagnoses made on the autopsy table are not always reliable. There are still careless or insufficiently trained persons called upon to do this rather delicate work. It may happen also that the most careful and searching autopsy will not furnish the true diagnosis until a thorough microscopical examination has been made. Take for example the case of Walter Kretschmar; [4] also of Morelli.[5] This latter case is remarkable for a number of unusual features: the youth of the patient, — a female aged twenty-eight, — the sudden onset after cold, with fever and cough, the clinical symptoms of a pneumonic consolidation in right base with pleural effusion and endocarditis. The sputum showed diplococci. On autopsy both lungs showed white nodules, corresponding to blood vessels, and connective tissue strands not infrequently seen after pneumonic processes. No tumor could be recognized, and only upon microscopic examination were nests of epithelial cells discovered in the lymph spaces

[1] Spezielle Pathologie u. Therapie der Lungenkrankheiten, 1904.

[2] Die Lehre von der Krebskrankheit, Vol. II, pp. 803 ff., Jena, 1911.

[3] Credit must be given here to Alfred v. Sokolowski, Klinik der Brustkrankheiten, Vol. I, Berlin, 1906, and his study of primary malignant and non-malignant neoplasms of the bronchi and lungs. He seems to consider bronchial carcinoma extremely rare, — much more rare than primary tumors of the lung. He has a chapter of about fifteen pages devoted to lung tumors, citing several cases of his own experience. He goes rather quickly over the pathology and diagnosis of carcinoma and in the same way hurries over sarcoma without bringing in anything notably new.

[4] Über das primäre Bronchial- und Lungencarcinom, Diss. Leipzig, 1904.

[5] Table I, No. 201.

of the fibrous tissue, and epithelial clusters in the alveoles and in the alveolar septa.

Furthermore, v. Hansemann [1] relates that in his experience at the Friedrichshain Hospital there were 711 carcinomata out of 7790 autopsies, of which 156, or 21.94%, were not diagnosticated during life, not even as tumors. Among these 156 cases there were sixteen bronchial and pulmonary tumors. Is it not somewhat humiliating to realize that the difficulties of diagnosis are still so great as to prevent the best and most experienced medical men, with all the advantages of a large hospital, from discovering almost one-fifth of all the carcinomata that come before them? If these figures hold good generally, about one-fifth more carcinoma cases should be added to our ordinary statistics. Another important addition to the difficulties to be contended with lies in the fact that in many countries, as for example our own, justly claiming an advanced stage of civilization, the overwhelmingly great majority of the dead are not subjected to any post-mortem examination, and the death certificates on which burial permits are officially given are often ludicrously insufficient. For this reason the United States Census is entirely useless for our purposes. As an example of the misleading diagnoses and insufficient observation which hamper one in getting up the literature of this subject, look up the following: Two Cases of Melanotic Tumors in the Lungs.[2] Reliable autopsies, in the majority of cases, there are not, and many autopsy notes that have been recorded are so insufficient in their data and descriptions that a conclusive opinion on the case cannot be formed. The same applies to the clinical notes. It is therefore impossible to say, from the figures given by the United States Census concerning causes of death, how many persons mentioned as having died from tuberculosis, pneumonia, or kindred diseases, may not really have died from lung tumors.

Considering all this, it seems primarily necessary to

[1] Riechelmann, Eine Krebsstatistik vom pathologisch-anatomischen Standpunkt, Berl. Klin. Woch., 1902, N. 31 and 32, pp. 728 ff.

[2] Journal A. M. A., 1888, p. 53.

procure enlightenment on the question: Are malignant tumors of the lung as rare as has been supposed? And if they are not so rare, is their more frequent occurrence due to a supposed general increase in the incidence of malignant growths? Williams,[1] an enthusiastic exponent of the increase of carcinoma as a whole and the corresponding decrease of tuberculosis, supports his view with a great mass of statistical figures, of which some few are quoted here.

INCIDENCE IN ENGLAND AND WALES

1840	2786, a proportion to total number of deaths of 1:129, or 177 per million living.	1905	30221, a proportion to total number of deaths of 1:17, or 885 per million living.

As to Newsholme's contention[2] that the registered increase is only apparent, being actually due to improved methods of diagnosis and death certification, Williams's answer is that (1) the uniformity in increase is too marked to be due to improved diagnosis, and (2) the very improvements cited have also caused subtractions from the cancer total, since many diseases formerly erroneously called cancer are now given their true names. Nencki is quoted in this connection[3] as giving the increase in cancer death-rate in Switzerland from 114 in 1889 to 132 in 1898 (per 100,000 living). Williams gives the following figures for other countries:

DEATHS FROM CANCER

Paris, France	1865	84	United States (per 100,000 living)	1850	9
	1900	120		1900	43
Germany	1872	59	New York	1864	32
	1900	71		1900	63
Berlin	1870–1882	57	Boston	1863	28
	1899	109		1903	85
Italy	1880	21	New Orleans	1864	15
	1905	58		1903	82
			San Francisco	1856	16
				1900	112

[1] Natural History of Cancer, New York, 1908.

[2] Proceedings of the Royal Society, 1893, Vol. LIV, p. 209.

[3] Die Frequenz und Verteilung des Krebses in der Schweiz, etc., Zeitschr. f. schw. Statistik, 1900, Vol. II, p. 332.

Other important statistical work to be consulted is that of Robert Behla,[1] the great standard work, in four volumes, of Juliusburger,[2] and the work of Newsholme.[3] Looking carefully over these statistics, it is the writer's opinion that the statistics of Williams, as well as all statistical material thus far collected, with a great deal of care and labor, have not succeeded in proving conclusively that there is a real increase in the incidence of cancer and a corresponding decrease in the incidence of tuberculosis. The fact may turn out to be so, but at this writing can by no means be considered as proven. The only figures which in the course of time will give us the means of definitely solving problems such as this will be those obtained from hospitals, where the material is more uniform, where the best modern methods of observation and diagnosis are applied, and where finally the autopsies and microscopical examinations are done with the utmost care. Reports of life insurance officers, statistics taken from books of registrars and recorders, where only the causes of death are mentioned, cannot be effectively utilized.

It has been shown, especially by the researches of Behla just quoted, that some sort of influence of occupation or trade may possibly be considered a factor in the incidence of carcinoma. If so, this factor is of very slight significance and may, at least for the study of lung tumors, be entirely disregarded.

It is the conviction of the writer, and he shares this belief with many others, — the mention of whose names and criticism of whose work need not be entered upon here, — that there is no absolute increase in the incidence of carcinoma. Nevertheless, the incidence of malignant neoplasms of the lungs seems to show a decided increase. It has been stated that statistical research in this direction is beset with many difficulties. It may be hoped that in the course of a few

[1] Krebs und Tuberkulose in beruflicher Beziehung vom Standpunkte der vergleichenden internationalen Statistik, Berlin, 1910.

[2] Die Krankheits- und Sterblichkeitsverhältnisse in der Ortskrankenkasse für Leipzig und Umgegend.

[3] The Statistics of Cancer, The Practitioner, April, 1899.

years accurate and reliable figures will be available. In the meantime, however, the following table, founded on figures collected by Karrenstein [1] and considerably amended and enlarged, will at least serve to show, not the causes, but the fact of the apparent increase. It is very significant that in

PRIMARY CARCINOMA OF THE LUNGS AND BRONCHI

I Time	II Place	III % of all Carcinoma	IV Total No. Carcinoma Cases	V % of all Autopsies	VI Total No. of Autopsies	VII Author
1. 1852–67	Stadtkrankenhaus, Dresden	0.91			8716	Reinhardt [2]
2. 1852–1908	Patholog. Institut, Würzburg	15 or 0.93	1607			Föckler [3]
3. 1854–85	Stadtkrankenhaus, München	8 cases		0.065	12307	Fuchs [4]
4. 1870–88	Patholog. Institut der Universit. Kolozsvar	0	145			Buday [5]
5. 1872–89	Patholog. Institut, Bern	2 0.42	474	0.059	3363	C. Müller [6]
6. 1872–98	Reichsgesundheits-amt, Hamburg	84 0.70	11930	0.02	336486	Reiche [7]
7. 1873–87	Patholog. Institut, Kiel	0				Danielsen [8]
8. 1877–84	Stadtkrankenhaus, Dresden	9 cases		0.22	4712	Wolf [9]
9. 1881–94	Patholog. Institut, Breslau	1.83	870		9246	Pässler [10]
10. 1885–94	Stadtkrankenhaus, Dresden	31 cases		0.43	7728	Wolf [11]

[1] Charité-Annalen, Berlin, 1908.

[2] Reinhardt, Der primäre Lungenkrebs, Arch. f. Heilkunde, XIX, 1878.–2.

[3] Föckler, Krebsstatistik nach den Befunden des patholog. Instituts zu Würzburg, Diss. Würzburg, 1909.

[4] Füchs, Beitr. zur Kenntnis der Geschwülstbildungen in der Lunge, Diss. München, 1886.

[5] Buday, Statistik der im patholog.-anatom. Institut der Universität Kolozsvar usw. Zeitschr. f. Krebsforschung, Vol. VI, S. 7.

[6] Müller, C., Beitrag zur Statistik der malignen Tumoren, Diss. Bern, 1890.

[7] Reiche, Beiträge zur Statistik des Carcinoms, Deut. Med. Woch., 1900, N. 7, p. 120 ff.

[8] Danielsen, Quoted from Schlereth, 2 Falle von primärem Lungenkrebs, Diss. Kiel, 1888.

[9] Wolf, Fortschritte der Medizin, 1895.

[10] Pässler, s. S. 315, No. 5.

[11] Wolf, loc. cit.

PRIMARY CARCINOMA OF THE LUNGS AND BRONCHI — *Continued*

I	II	III	IV	V	VI	VII
Time	Place	% of all Carcinoma	Total No. Carcinoma Cases	% of all Autopsies	Total No. of Autopsies	Author
11. 1886–96	Krankenhaus, München	9 1.2	706	0.10	8727	Perütz[1]
12. 1887–1906	Patholog. Institut, Wien	68		0.17	40000	Haberfeld[2]
13. 1888–97	Patholog. Institut, Greifswald	1.78				Kaminski[3]
14. 1888–1905	Patholog. Institut, Universit. Kolozsvar	10 4.5	221			Buday[4]
15. 1895–1901	Friedrichshain, Berlin		711		7790	Riechelmann[5]
16. 1899–1903	Patholog. Lab. Lubarsch, Posen	3 1.2	159	0.17	1741	Sehrt[6]
17. Vor 1900	Patholog. Institut am Urban-Berlin	4	100	0.4		Feilchenfeldt[7]
18. 1899–1904	Patholog. Institut am Urban-Berlin			0.6		Benda[8]
19. Zeitraum v. 10 Jahr.	Patholog. Institut, Univ. München	20 1.92				Rieck[9]
20.		6 1.3	447			Lebert[10]
21. 1900	Patholog. Institut, Charité-Berlin	2.91 3 cases	103	0.23	1300	Karrenstein[11]
22. 1900–05	Urban-Berlin	31 0.61	496	0.6	5002	Redlich[12]
23. 1901	Patholog. Institut, Charité-Berlin	8.86 7 cases	79	0.53	1310	Karrenstein[11]

[1] Perütz, Zur Histogenesis des primären Lungenkarzinoms, Diss. München, 1897.

[2] Haberfeld, Carcinom des Magens, der Gallenblase und Bronchien. Z'tschrift f. Krebsforsch., Vol. VII, I. Fasc., p. 204.

[3] Kaminski, s. S. 315, No. 6.

[4] Buday, loc. cit.

[5] Riechelmann, Eine Krebsstatistik von path.-anatom. Standpunkt, Berl. klin. Woch., 1902, N. 31 and 32, pp. 728 ff.

[6] Sehrt, Beiträge zur Kenntnis des primären Lungenkarzinoms, Diss. Leipzig, 1904.

[7] Feilchenfeldt, Quoted from Benda, Deut. Med. Woch., 1904, S. 1454. Beiträge zur Statistik und Kasuistik des Karzinoms, Diss. Leipzig, 1901 (after Redlich).

[8] Benda, loc. cit., S. 1453.

[9] Rieck, Krebsstatistik nach den Befunden des patholog. Instituts zu München, Diss. München, 1904.

[10] Lebert, Traité pratique des Maladies cancereuses.

[11] Karrenstein, Charité-Annalen, XXXII Jahrg., Berlin, 1908.

[12] Redlich, Die Sektions-Statistik des Carcinoms, etc., am Stadt-Krankenhaus am Urban, 1900–1905, Diss. Berlin, 1907.

PRIMARY CARCINOMA OF THE LUNGS AND BRONCHI — *Continued*

I Time	II Place	III % of all Carcinoma	IV Total No. Carcinoma Cases	V % of all Autopsies	VI Total No. of Autopsies	VII Author
24. 1902	Patholog. Institut, Charité-Berlin	3.23 3 cases	93	0.31	999	Karrenstein[1]
25. 1903	Patholog. Institut, Charité-Berlin	3.19 3 cases	94	0.24	1272	Karrenstein[1]
26. 1904	Patholog. Institut, Charité-Berlin	2.67 4 cases	150	0.28	1399	Karrenstein[1]
27. 1905	Patholog. Institut, Charité-Berlin	0.71 1 case	140	0.08	1313	Karrenstein[1]
28. 1906	Patholog. Institut, Charité-Berlin	4.84 6 cases	124	0.46	1319	Karrenstein[1]
29. 1906–08	Krankenhaus, r. d. I., München		174	0.18	945	Forstner[2]
30. 1907	Patholog. Institut, Charité-Berlin	3.31 5 cases	151	0.37	1360	Karrenstein[1]
31. 1908	Stadtkrankanstalten, Hamburg	11 1.2			920	Körber[3]
32. 1908–09	Patholog. Institut Krankenhaus, München	1.8	212	0.29	1371	Nobiling[4]
33.	Basel	1.76				Kaufmann[5]
34. 1910–11	Charité-Annalen, Berlin	0.76	141	0.05	185	Orth[6]

1900 the Pathological Institute of the Charité in Berlin recorded only three cases of lung tumor, while in 1906 and 1907 five and six cases respectively, were recorded. It is more significant still when the reports of the Pathological Institute of Kolozsvar from 1870 to 1880 and from 1888 to 1905 respectively, are compared. It is to be remembered that this table is made up mainly from records of pathological laboratories of fairly high standing.

There seems hardly room for doubt that the increase in the percentage of lung tumors is to be attributed mainly to

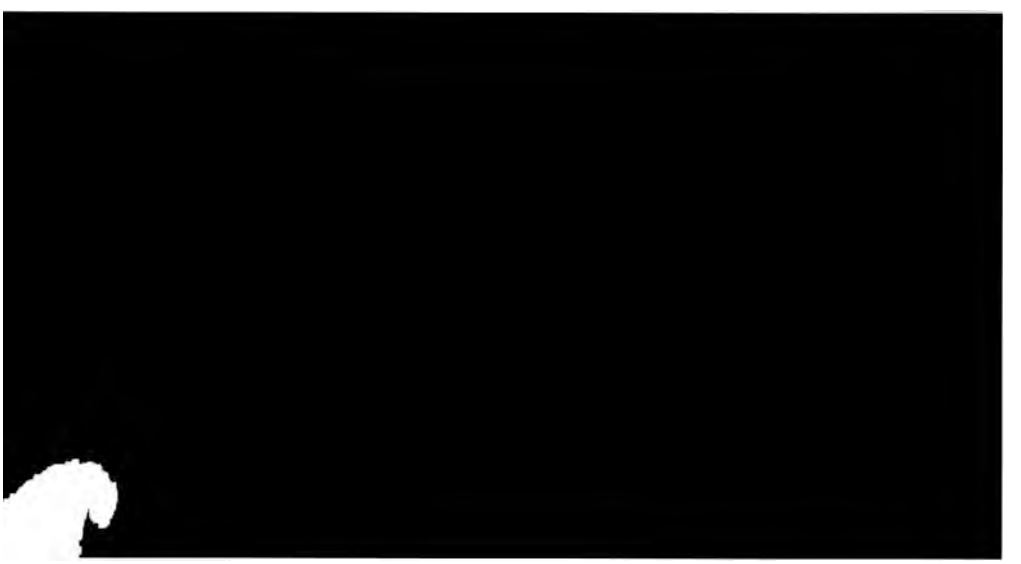
[1] Karrenstein, Charité-Annalen, XXXII Jahrg., Berlin, 1908.
[2] Forstner, Über maligne Tumoren, Diss. München, 1908.
[3] Körber, Die Ergebnisse der Hamburgischen Krebsforschung im Jahre 1908. Mitt. Hamburgischen Staatskrankenanstalten, Vol. IX, Supp., 1908.
[4] Nobiling, Z'tschrift f. Krebsforsch. patholog. Institut Krankenhaus, München, r. d. I., 1908–1909.
[5] Kaufmann, Lehrbuch der Spec. Path. Anatomie, Basel, 1909.
[6] Orth, Charité-Annalen, Berlin, XXXV Jahrg., 1911.

the increased attention paid to these types of tumor and the greater care and more extensive microscopic investigation with which autopsies are carried out at present. As early as 1837, Stokes[1] had already remarked that in his experience lung tumors are by no means as rare, either in England or in Ireland, as was generally assumed, and Boyd[2] even goes so far as to assert that primary cancer is more frequent in lungs than secondary cancer, an assertion which he explains as follows: "A case of malignant deposit in the bronchial glands, infiltrating the lung, ending in ulceration and the formation of cavities, is frequently set down as one of hopeless phthisis, a post-mortem on which would be of no interest, and all record of the frequency of the disease is in consequence entirely lost." This utterance of Boyd's is probably somewhat of an exaggeration, for while it has just been shown that the belief in the extreme rarity of lung tumors, a *lusus naturae*, as it were, can no longer be maintained, it must be conceded that these tumors belong to the class of rarer neoplasms and their incidence is out of all proportion to the frequency of occurrence of other malignant neoplasms, as for example of the female breast or the stomach.

Seeing, thus, that lung tumors are to be reckoned with more often than was formerly believed, it is to be expected that numerous problems, both pathological and clinical, will present themselves. Besides these problems of purely theoretical interest to the pathologist and the clinician, there is the great importance to the patient of a correct diagnosis. It cannot be a matter of indifference to the unfortunate sufferer whether his case be diagnosticated as tuberculosis or as tumor. If tuberculosis, he will be sent from one climate and one sanitarium to another, he and his family possibly deluded with false hopes, until finally secondary symptoms have cleared up the case and death has brought relief. The grave prognosis which is an integral part of the diagnosis of tumor may be of paramount importance to the patient as well as to his relatives. At all events, so much is certain, that if

[1] Diseases of the Chest, London, 1837.
[2] Table I, No. 46.

the diagnosis of lung tumors is to be developed so as to render it more precise, and if any reasonable attempt is to be made to convert the present desperate prognosis into one less hopeless, this great result can only be achieved if the internist shall work hand in hand and shoulder to shoulder with the surgeon. The internist must be able to furnish as early and as accurate a diagnosis as possible, so that the surgeon under favorable conditions may develop his technique as early as possible. With these few introductory words, the initial question, it is dared to hope, is answered affirmatively.



CHAPTER II

INTRODUCTORY (Continued)

IN undertaking to write this monograph, it is proposed to present the subject and the problems connected therewith in as comprehensive and at the same time as concise a manner as possible. Not only carcinoma, but the other malignant tumors of the lung are to be presented, both from a broad pathological, as well as from a clinical point of view.

As the first step toward the accomplishment of this end, it was found necessary to collect a very large material from the literature. Thus far, but comparatively few cases had been picked up. Pässler,[1] after much sifting, managed to collect about seventy-four cases of undoubted primary carcinoma of the lungs. This was in 1896, just fifteen years ago. The latest publication [2] casually remarks that about one hundred cases may now be found in literature. The difficulties of collecting cases in point have already been hinted at. It is extremely trying to delve into all sorts of doctor-dissertations, obscure and forgotten publications of all kinds and in all languages, to be frequently rewarded by finding that, after all, the case is secondary, or is not a case in point at all, or that no autopsy was made, or that no microscopic examination was reported. Again, no clinical history is given, and the pathological diagnosis, though modern and very good, is not sufficiently supported by clinical observations. The collection of cases from modern times has been simplified by the introduction of the microscope into pathology and the nomenclature of tumors based on microscopic

[1] Virch. Arch., Vol. 145, 1896, p. 191.

[2] Edward Boecker, Zur Kenntnis der primären Lungenkarzinome, Diss. Göttingen, Berlin, 1910.

study, which latter, though not fulfilling all demands, is most helpful. But even within the last two years, reports have been published where there is no autopsy at all, or one that is very insufficient, and the microscopic examination is either absent or summarized in such general terms as "simple carcinoma," etc. Nevertheless, though it has taken several years in the compiling, 374 cases of carcinoma have been collected. It was thought best to make full abstracts wherever possible, so that the principal data of each case, both clinical and pathological, may be at the disposal of the reader, enabling him to use his own judgment and form his own deductions. The same has been done for sarcoma, though the latter is infinitely more difficult to get at than carcinoma, — not only because sarcoma is so much rarer, as will be seen, but because very many cases are published without sufficient autopsy, and even if autopsied the almost intolerable confusion in the nomenclature makes the diagnosis from the printed case wellnigh impossible.

A third collection has been made which contains cases designated as doubtful, though many of them may be authentic and valuable. They have been classed as doubtful for various reasons, sometimes because the autopsy was lacking, though the clinical observations pointed almost with certainty to a tumor diagnosis, or it was impossible to decide whether the case was one of carcinoma or sarcoma, etc.

A few other cases have been assembled which, properly speaking, do not belong to the subject in hand, but which may in their symptoms during life so closely resemble primary growths of the lung that it was thought wise to place them here for warning and for comparison.

The reader should well understand that no claim is made for absolute completeness. Many cases were not taken into our collection either because they were not obtainable, or were written in a language that could not be readily translated, or for other reasons. Besides this, too, it was impracticable to continue collecting material indefinitely, and since the collection of material has been discontinued numerous cases have been published, which could not appear in the present collection. It may be stated also that, with the

exception of but comparatively few, the references were read and excerpted personally. This rather bulky collection is printed in the form of tables, the first and largest being of *carcinoma* cases; the second, *sarcoma;* the third, *doubtful;* and the fourth, a few *miscellaneous* cases.

CHAPTER III

A FEW HISTORICAL NOTES

Precancerous Influences

OUR knowledge of lung tumors dates from comparatively recent times, and the history of its development can be sketched in a very few words. It may aptly be divided into several periods. In the first and longest period, lung tumors were absolutely unknown. This period includes all of ancient and mediæval medicine until Morgagni [1] (1682–1772) laid the foundations of pathological anatomy. It is most interesting and significant that Morgagni himself was probably the first to publish the results of several autopsies on lungs that might be diagnosticated as cancerous, and were so interpreted by him. It is probable that the first of the cases which he published as cancer of the lungs was really a case of *primary* lung tumor. In this case he describes the disease of a man sixty years old, which was accompanied by cough and copious expectoration of a yellowish, rather crude material, rarely, but then distinctly, stained by streaks of blood. At autopsy the lung was found extremely hard, adhesions to pleura and mediastina, and nothing else but an "ulcus cancrosum" in the right lung.[2] The oft-quoted observations of Lieutaud [3] deal probably with tuberculosis or diseased pleura, and not with tumor. The cases mentioned by Van Swieten [4] must also be considered extremely doubtful.

[1] De Sedibus et Causis Morborum per Anatomen indigatis.
[2] Loc. cit.
[3] Historia anatomico-medica, etc., Paris, 1767, Lib. II.
[4] Comment. ad Boerhaavi Aphorism, Vol. II, 1747.

There are a number of French authors about this time[1] who published cases as cancerous that cannot be distinguished with certainty from tuberculosis. G. L. Bayle[2] published three cases which he had carefully studied clinically and equally carefully after death, and he is the author of the phrase "phthisie cancereuse" which caused so much discussion. The first case he reports may possibly be a primary tumor, although this is doubtful. The second case is certainly secondary after amputation of the arm. The third case was that of a man seventy-two years old, in which there were found at autopsy, at the root of the lung, shining white encephaloid cancerous masses, which were associated with masses of tuberculosis. It is unnecessary to go into all the clinical and pathological details and theories on which Bayle bases his conclusions. There is some merit in his insistence that cancer and tuberculosis may exist together, although the tubercles, according to him, are the effect of an acid, and cancer the effect of an alkali. No clear idea, however, can be obtained of what he means by cancer and what by tuberculosis, and it consequently happened altogether too frequently that his followers accepted true tubercular cavities as cancerous, and vice versa, so that finally great confusion arose as between tubercular phthisis and cancerous phthisis. His contention that cancer of the lungs may exist for a very long time without any symptoms has been corroborated by modern medicine. On the other hand, he makes no distinction between primary and secondary tumor.

Besides the French, a number of German authors have worked on lines similar to those of Bayle, and though the name "phthisie cancereuse" could not maintain itself for a very long period, the name "fungus hæmatodes," or simply "fungus of the lung,"— especially among German writers,— was used for all pulmonary neoplasms that bore a suspicion of malignancy. Those seeking further information of these

[1] Le Dran, Mém. de l'Acad. royale de Chir., Vol. III, p. 28, Obs. 22. Also J. F. Senaux, fils.

[2] Journal de Médicine, Tome 73, 1787. Also Recherches sur la Phthisie pulmonaire, Paris, 1810, p. 299. Also Dict. de Science méd., Paris, 1810.

historical questions are referred to the English classics, especially Stokes,[1] Graves,[2] and Walshe;[3] and also to the, for that period, very complete and thorough works of Reinhold Köhler,[4] and among modern authors, J. Wolff.[5]

With Bayle and his followers ends the second period, and we enter upon the third, characterized by the study of lung tumors by purely clinical methods, reënforced by gross pathological anatomy. This period is introduced by Laennec, the author of l'Auscultation Médiate, who, with his great authority and keen mind, took up the combat against Bayle and his after all not very progressive theories of the "phthisie cancereuse" and successfully differentiated the carcinoma of the lungs, whether primary or secondary, from any form of phthisical process, even though cavities should be found connected with the tumor. He described tumor of the lung in the clearest terms, under the designation "encephaloid." The use of this term, applied promiscuously to all sorts of tumors, caused considerable confusion until Virchow worked out a rational classification.

Since the time of Laennec, his lifework, the practice and perfection of the methods of auscultation and percussion, has been assiduously continued and by these means a comparatively large number of lung tumors has been diagnosticated and reported. For a long time the necessary distinction between primary and secondary tumors was not upheld, and a number of cases were insufficiently observed and carelessly reported, but still progress in the diagnosis of primary tumor of the lungs was certainly made. J. Bell[6] is said to have been the first to diagnosticate *with certainty* a primary tumor, which was undoubtedly sarcoma of the lung. The real founder of this school is Stokes, who, together with Graves, Walshe, Hughes, and others, laid the foundations of our present clinical and pathological knowledge of primary lung

[1] Loc. cit.

[2] Clinical Lectures on the Practice of Medicine, London, New Sydenham Soc., 2d Ed., Dublin, 1848, by J. Moore Neligan.

[3] A Practical Treatise on Diseases of the Lung, etc., 4th Ed., London, 1871.

[4] Über den Lungenkrebs, Diss. Tübingen, 1847, and Die Krebs- und Scheinkrebskrankheit des Menschen, Stuttgart, 1853.

[5] Loc. cit.

[6] Table II, No. 3.

tumors. Following upon this period of purely clinical and gross pathological observation, there comes the time when, after the fundamental discovery of Schwann, histology becomes the main factor in pathological research. After the great work of Rokitansky,[1] in gathering together a very large material which led to a general cleaning-up and reclassifying of pathological anatomy, it is above all the name and work of Virchow that dominate this entire epoch. He was the first to demand that medicine be lifted out of a maze of hypotheses and more or less plausible theories to become one of the natural sciences, based on critical observation and experiment. The "cellular pathology," with its battle-cry of "Omnis cellula e cellula," exercised great influence on the study of tumors. The entire onkology was taken up again and rearranged in the light of the fact that every cell originated, not from blastema, not from plastic lymph, not from diatheses or other exogenic processes, but from cells alone.[2] The present time is still a part of this period, and the study of lung tumors must be continued along these lines.

Notwithstanding the great amount of work that, as has just been shown, has been done and is still going on, Williams[3] is probably correct when he makes the somewhat brusque statement that "it is necessary at the outset to refer thus pointedly to the crudeness and immaturity of medical knowledge, because nowhere do these qualities find more striking exemplification than in the terrible welter of disjointed facts and contradictory hypotheses that constitute such a large part of modern 'tumor science.'" There cannot be any intention to discuss here the multitude of questions and problems concerning the etiology and the true nature of malignant growths in general. The many questions of fundamental import, the attempts into the field of etiology, the innumerable

[1] Lehrbuch der pathol. Anatomie, 1844.

[2] Thiersch, Der Epithelialkrebs namentlich der Haut, Leipzig, 1865; Waldeyer, Über den Krebs, Volkmanns Samml., 1873, No. 33; Bard, La Spécificité cellulaire et l'Histologie chez l'embryo, Arch. de Phys. normal. et path., 3 Ser., 7, p. 406, the author of the aphorism: "Omnis cellula e cellula ejusdem generis."

[3] Loc. cit.

theories, and above all, the enormous experimental work that has been done within recent years, — all this is obviously beyond the scope of this little monograph, which is to be devoted solely to the study of lung tumors.

Nearly all the types of malignant neoplasms that occur in other parts of the body are also to be found among the primary growths of the lung, but before taking up the direct study of these tumors, some attention should be given to the conditions which have long been called "predisposing causes," but which latterly and more significantly are termed "precancerous conditions and affections."[1]

First, the influence of *race* on carcinoma. According to the latest statistics, race and geographical distribution seem to have a decided influence on the incidence of malignant growths.[2] In the very thorough work of Dr. Levin,[3] sufficient proof appears to be found that there is less cancer among the American Indians and American negroes than among the whites. Tuberculosis decimates the American Indians, while they are almost immune to cancer. This seems to contradict the statistical conclusions arrived at by Behla.[4] Levin notes, too, that it is usually sarcoma or epithelioma of the different *external* parts of the body, which are necessarily more exposed to mechanical irritations, that affect the primitive races. In civilized nations there is a prevalence of carcinoma of the *internal*, parenchymatous organs. The following sentence, quoted from Levin, is important: "Thus the conclusion is forced on one's mind that, while every human being may carry within himself the X which may develop into cancer, it is the modern civilization and the conditions created by it that give rise to the mediate causes which produce the disease." The facts, indeed, at present available, support the conclusion that the white races,

[1] All these data and figures have evidently been worked out principally for carcinoma, sarcoma being brought in now and then incidentally only, probably because of its rarity, possibly because no difference was made between the two.

[2] Carl Lewin, Die Bösartigen Geschwülste, Leipzig, 1909. Also Williams, loc. cit.

[3] I. Levin, Cancer among the American Indians, Zeitschr. f. Krebsforsch., Vol. X, Heft II, 1911.

[4] Loc. cit.

especially in Europe and the United States, can claim the greatest mortality from malignant growths, and there is only China, perhaps, that can compete with them in this respect. It is reasonable to suppose that this applies also to lung tumors, though there are no special statistics.

Next, the question of *heredity*. This has always been considered a very potent factor in the etiology of malignant neoplasms in general. Josefson and Pfannenstill[1] have already noticed, however, that this does not apply to lung tumors. They have found only one case of accredited heredity among their seventy cases. According to Table I, in 290 cases of carcinoma heredity is not mentioned. As many of these cases are very superficially reported, and as in many others no clinical history is given, but the cases are simply introduced as pathological specimens, it is likely that among these 290 cases there may be many where the factor of heredity was simply overlooked. In twelve cases only it was positively stated that there was a hereditary strain of cancer in the family, and in sixty-eight instances it was asserted that *no* hereditary strain could be discovered. According to the German Sammelforschung, in 9% of the males and 10.3% of the females hereditary predisposition for cancer was found.[2] The experimental study of tumors has thus far not furnished any decided proof of the value of heredity as a causal factor, and Bashford is inclined to deny its influence altogether. It follows, — though the figures are very uncertain, — that the incidence of malignant growths of the lungs does not appear to be seriously affected by hereditary strain.

The influence of *sex*. M. Askanazy[3] maintains that there is a distinct connection between premature sexual development and the development of malignant growths. Among tumors of other kinds he quotes also Linser,[4] who reported the case of a boy thirteen years of age with a complete

[1] Primary Cancer of Lungs, Nov. Med. Arch., Stockholm, 1897, N. F. VIII, Festband, Axel Key; and Lubarsch and Ostertag, Ergebnisse, Wiesbaden, 1904, Vol. VIII, 1902.

[2] Quoted from Lewin, loc. cit.

[3] Über Sexuelle Frühreife, Zeitschr. f. Krebsforsch., Vol. X, Heft. III, 1910.

[4] Virch. Archiv., 1899, Vol. 157, S. 281.

development of hair such as is seen after development of puberty. He died of a tumor in the left pleural cavity and mediastinum which, on examination, showed absence of elastic fibres, in stroma, no ciliated epithelia, the epithelial cells in certain places still stratified. The natural history of these evidently congenital tumors is as yet entirely obscure.

It has always been maintained that males are by far more frequently subject to lung tumors than females. Tables I and II corroborate this. Among the 374 cases of carcinoma of the lungs, there are 269 males, or 71.9%; ninety-three females, or 24.8%; twelve in which the sex is not stated. In the same way, among ninety-four sarcoma cases, sixty-three, or 67%, are males; twenty-eight, or 29.7%, females; three where sex is not stated. The domestic life led by women, with their consequent retirement and immunity from the irritations and traumatisms which must be frequent in the more unprotected life of men (the abuse of tobacco and alcohol, the many trades and vocations which are accompanied by irritations of the respiratory organs, etc.) has been adduced in explanation of this fact. The entire subject is not yet ready for final judgment.

The *age* of the patient. It is indisputable that age has a certain influence upon the incidence of both carcinoma and sarcoma. Statistics seem to show that carcinoma, roughly speaking, is a disease of that period of life which follows puberty after its completion, while, on the other hand, sarcoma as a rule is a disease of the earlier years of life. But there are exceptions, and no age is entirely exempt from either type of tumor. The following figures, gathered from Tables I and II, clearly illustrate this. It is evident from this that the majority of carcinoma cases lies beyond the age of forty and attains its maximum between the ages of fifty and sixty. Descending slowly there are still two cases remaining between eighty and ninety, while the majority of sarcoma cases lies below the age of forty, climbing up slowly from the decade between ten and twenty, reaching the maximum between thirty and forty, declining again, slowly, and there are still five cases between seventy and eighty.

The first decade, from birth to ten years, seems to be immune from carcinoma (without counting, of course, the few cases of congenital tumor).

Carcinoma		Sarcoma	
Age not stated	18	Age not stated	9
1–10	0	1–10	6
10–20	6	10–20	12
20–30	10	20–30	14
30–40	30	30–40	19
40–50	78	40–50	14
50–60	113	50–60	12
60–70	94	60–70	3
70–80	23	70–80	5
80–90	2		94
	374		

These figures tally satisfactorily with the age tables given by many authors, for instance Fuchs.[1]

The question of the influence of age upon the incidence of malignant neoplasms is one that is intimately connected with certain problems that have of late years been thoroughly studied and widely discussed, — the problems of growth and of senility in their physiological and pathological bearings. The older theories, such as those of Thiersch[2] and others, that as the body grows older the interstitial tissue undergoes a change, the equilibrium between this and the epithelium is impaired, in consequence of which the epithelial tissue proliferates and tends to form carcinoma, while, on the other hand, in youth the connective tissue group is apt to overstep the bounds set to it and thus sarcoma and similar tumors may be formed — these theories no longer hold good. It has just been shown that no age is absolutely immune from the formation of neoplasms and that even in intra-uterine life tumors of all kinds may be developed. These facts seem to lead to the unavoidable conclusion that deeper and more complex principles are involved. It is altogether foreign to the purpose of this study, and would require a book by itself, to go into details concerning the modern theories of growth and senility. It will suffice to say

[1] Beiträge zur Kasuistik des prim. Lungencarzinoms, Diss. Leipzig, 1890.
[2] Loc. cit.

that developmental energy of a high degree becomes active as soon as the sperma enters the ovum. After that, until the organism is fully grown, there is a continuous balancing of energies as manifested in highly complicated chemical and physical processes. Immediately with the completion of growth, the changes begin which lead to senescence and final destruction of the body. The study of the intricate chemistry and physics of growth, regeneration, and senescence is by no means concluded, but has in reality only just begun. The relation of these problems to the formation and development of neoplasms is as yet sufficiently obscure, but many a single ray of light shed here and there justifies the hope of further enlightenment in the near future.

It is of special interest in this connection to study the work of Rössle,[1] from which only a few conclusions may be quoted. It appears to him as certain that hyperæmia is able to produce a considerable increase in the number of those cells which are organically an integral part of the matrix, and for that reason are subject to the laws of nutrition specific to the latter. Hyperæmia, however, cannot produce those biological alterations in the cells in consequence of which endless proliferation is caused. Rössle agrees, also, that hyperæmia alone cannot account for the development of tumor, but must be associated with many other factors, among others, probably senescence. His aphorisms concerning senility are also most plausible and interesting. There may be senescence of the entire organism or of individual organs only. Senility does not attack different parts of the body simultaneously. While one part may long ago have become senescent, other organs may as yet be quite youthful. According to Rössle, the general law may probably be that the more intense the function, the sooner the cell grows old. It is doubtful if, with all their plausibility, these theories will stand before more than a superficial investigation. Rössle further asserts that epithelium in general retains its juvenile status approximately during the entire life of the individual

[1] Die Rolle der Hyperämie und des Alters in der Geschwulstentstehung, ch. Med. Woch., 1904, p. 1330.

and can be rejuvenated by karyokinesis and regeneration. The earlier in the course of the life of an organism a tissue becomes senile the earlier it will be possible for tumors to be developed from this tissue, for according to Rössle it is not those cells and tissues which have become senile, but those which have remained youthful and capable of reproduction and regeneration, which form the origins of these tumors.

CHAPTER IV

PRECANCEROUS INFLUENCES (Continued)

AS all these questions are most intimately connected with the question of the etiology of tumors, it will be best to say a few words in this place on the subject of etiology, at present the centre of so much discussion and labor. The despairing exclamation of Heyfelder,[1] — "Je passe sous silence l'étiologie et le traitement de cette maladie qui, jusqu'à présent, est hors du domaine de l'art," — is fortunately no longer true in its entirety. But still it must be confessed that, with all the colossal labor expended on the question of the etiology of tumors in the last half-century, the fundamental cause, the unknown X, that lies at the very bottom of all these manifold processes, is still entirely obscure and there is as yet not even a sufficient basis for an intelligent statement of the question that would seem to promise any result. What we know to-day of the physiology, the chemistry, and physics of growth and senility seems to suggest that malignant neoplasms might in general be accounted for in either one of two ways, and the discussions as to etiology actually do gravitate about these two points. Firstly, one might suppose, seeing that the greatest energy and the foundations for its proper balance are put out in early fœtal life, that neoplasms are based ultimately on some earlier or later intra-uterine disturbance. This is, indeed, the theory that was furnished and elaborated by Cohnheim and his followers.[2] Cohnheim, however, did not look upon all this

[1] Du Cancer du Poumon, Arch. Gen. de Med., Vol. 14, 2d Series, 1837, p. 345.

[2] Many years before Cohnheim, in the paper by Langstaff (Table II, No. 49) in 1818, that author says (p. 345) that he has noticed "pulpy tumors in the lungs of adult persons who had not been affected during their lives with the least symptoms of pulmonic disorder and who died of active disease of a

from the mere standpoint of general physiology and of chemistry, but assumed remnants of embryonal tissue in this or that organ which, left over, as it were, and endowed with proliferative energy, might under favorable conditions become active and produce tumors.

This theory of Cohnheim, which, for reasons not necessary to state here, seemed untenable, was again revived, though in a much modified form, by Borst[1] and his followers. Borst assumed, as the necessary foundation for the formation of neoplasms, early disturbances in the intra-uterine development, the nature of which is not as yet accurately known. According to him, it is not necessary to assume the bodily presence of actual embryonal remnants. He remarks that, according to his view, it is highly probable that each organ has its own peculiar onkology. A true carcinoma is not developed out of any, no matter how irregular, form of inflammation, no transformation into carcinoma is effected when short, glandular, cuboid cells happen to be turned into high cylindrical cells of entirely different structure or when high cylindrical cells happen to be changed into others, again of different structure and of different function, or when single layers of pavement epithelium become stratified into numerous layers of epidermal cells. All these and many more deformations of epithelium might be mentioned which, according to Borst's view, would in no wise transform the particular growth in hand into a carcinoma. What Borst does require, and requires without exception, is just that transformation of an epithelial cell into one of cancerous character, on the details of which so many express differing opinions, and the character of which is so difficult to describe and yet is so readily accepted as a matter of belief.

different description in other viscera." He is inclined to think that fungus hæmatodes and cancer and scrofula "have their origin perhaps with the formation and development of the natural parts of the fœtus in utero and that they remain, after the birth of the individual, in some instances dormant or inactive for a series of years, and in all only require a peculiar morbid excitement to occasion this increase and destructiveness."

[1] Die Lehre von den Geschwülsten, Wiesbaden, 1902. Über atypische Epithelwucherung und Krebs, Verhand. Deutsch. Path. Ges., Vol. 6–7, 1903–1904, p. 110.

It would be most interesting to continue in detail the history of the various theories and speculations which have led to the present state of our knowledge of malignant tumors. This is impossible, because the subject of this essay is tumors of the lung, and not malignant growths in general. The necessity of closely adhering to this special subject is still more imperative because of the enormous material on tumors in general published from year to year, a few examples of which have already been mentioned, as Willams,[1] Borst,[2] the various writings of Ribbert and especially his latest.[3] But even a simple catalogue of the more important writings on these subjects, with only carcinoma as a subject, would be enough to fill a small book. Does it not after all seem as if one theory were as good as another and might, by some clever reasoning, be selected according to the subjective taste of the author who elects to defend it? In the writer's opinion, the best evidence appears to be on the side of Borst and his followers. Be that as it may, one can only reiterate again and again that, with all the labor and time spent on these questions by workers in many separate fields of research, and especially the tremendous amount of experimental work that has of late years been done by Ehrlich and his school, by Bashford and many others, — while it has added much that is valuable to our general knowledge and has been of immense service to our better understanding of many medical and biological problems, especially of onkology, — in spite of all this, no light has been shed upon the ultimate etiology of tumors, and the words of Kraske [4] are in the main still true, — "We know no more to-day of cancer than did our grandfathers."

That cases of tuberculosis the world over, thanks to the preventive work done everywhere, are steadily diminishing in number seems indubitable. There is, as we have seen, a great deal of legitimate doubt as to the increase of carcinosis. Behla [5] has pointed out that by adequate disinfection of

[1] Loc. cit. [2] Loc. cit.
[3] Das Karzinom des Menschen, etc., Hugo Ribbert, Bonn, 1911.
[4] Naturforscherversammlung in Freiburg, März, 1902.
[5] Loc. cit., p. 177.

tubercular sputum, ulcers, and numerous other places where tubercle bacilli may be found or suspected, by proper isolation and proper sanitaria, etc., the progress of tuberculosis can to some extent be arrested and that a much greater advance in the arresting of this scourge of mankind may be hoped for in the future. It is quite different with carcinoma. There is as yet no known primary cause for malignant growths. Among the multitude of contagions that we know at the present day, none has been found that seems to have any connection, causative or otherwise, with carcinoma or sarcoma. Carcinomatosis, therefore, does not show any similarity with the contagious character of tuberculosis. It does not seem to spread infection from individual to individual. It is more than doubtful whether environment, as some authors maintain, plays any active part in the development of malignant growths. Behla has not succeeded in proving that special forms of vocation, trade, occupation, etc., or calling of any kind, have any active part in the causation of lung tumors. It is true enough that certain kinds of work are apt to produce *inflammatory* conditions (bronchitis acute or chronic, anthracosis, siderosis, chronic indurative pneumonia, and others), and the localization of tuberculosis may possibly be determined by such factors. But it has never been *proven* that any increased tendency toward the development of malignant tumors is caused thereby.[1]

It may be convenient in this connection to refer briefly to the so-called cancer of the lungs as occurring in the mines of Schneeberg, Silesia, Germany.[2] It was thought that here at least was proof positive of the production of malignant growths solely by the injurious effects of purely exogenic influences as furnished by irritating occupations. In this small Silesian

[1] Conf. the work of Williams, loc. cit.; Karl Kolb, Der Einfluss des Berufes auf die Häufigkeit des Krebses, Zeitschr. f. Krebsforsch., Vol. IX, Heft III, Berlin, 1910; Behla, loc. cit., and many others.

[2] Hesse, Das Vorkommen von primärem Lungenkrebs, die Bergkrankheit in den Schneeberger Gruben. Vierteljahrschrift f. gerichtliche Medizin, 1879, pp. 296 ff. Also Ancke, Lungenkrebs der Schneeberger Erzarbeiter, Diss. München, 1884. Also Körner, Münch. Med. Woch., 1888, No. 11.

town there were eight mines extending to a depth of fifteen hundred yards, from which cobalt, nickel, and bismuth were obtained. There were from six to seven hundred men employed in the mines, and of these the yearly mortality, excluding accidents and the like, was about twenty-eight to thirty-two, of which twenty-one to twenty-four were from carcinoma of the lungs, so that a total of seventy-five per cent of all miners in this town died from this disease. The worker was never affected until after twenty years of mine work, usually later, while the worker who survived fifty years of mine work was generally immune. Heredity can be excluded, for only those who worked in the mines, and worked steadily, were afflicted. Those who did not work continuously in the mines, or who had other occupations besides mining, or who lived better on the whole, might live to be seventy years or over. The symptoms need not be described here. The autopsies showed that the disease always commenced from the root of the lung where the lymph nodes were involved and enlarged, ranging from the size of a walnut to that of a fist. Sometimes secondary tumors in the subcutis of the thorax, visible from without, occurred. The tumors were examined frequently, especially by E. Wagner,[1] who found the nodules to be true lympho-sarcoma. Cohnheim[2] had already hinted at the likelihood of these tumors not being real tumors at all, but products of some infection. The question was studied in all directions. It was found that only those who did actual mining, and for a considerable number of years, were attacked by the malady; that there was no local irritation caused by the nickel or cobalt or bismuth particles, but that it was a form of poisoning due to the arsenic found in some quantity in those ores. In other mines of cobalt, nickel, etc., in Sweden, Hungary, and the Tyrol, where the ore contained no arsenic, the disease did not occur. Since the authorities have sufficiently ventilated the mines and have properly regulated the lives of the miners, nothing has been heard of the "Schneeberger Lungenkrebs."

[1] Eulenberg's Vierteljahrschr. f. Gerichtl. Medizin.
[2] Vorlesungen, Vol. I, p. 718.

TRAUMA. Much stress has been laid on traumatism as an important factor in the development of malignant neoplasms. By "traumatism" is meant here the injuries of the grosser kind, like severe contusions by blows, falls, and similar occurrences. It is always claimed that these severer forms of traumatism have some intimate and direct relations with the development and growth of malignant tumors; in fact are the growth-determining element. Statistics, however, do not seem to bear this out. Among the material collected in Table I dealing with carcinoma, there are but six cases in which traumatism in the ordinary larger sense is recorded.[1]

The really effective action of traumatism has for a long time been considered, as displayed in the development of sarcoma. Among the ninety cases tabulated on Table II, there are only two cases (Nos. 15 and 51) in which trauma is recorded. This seems to eliminate once and for all the idea that traumatism of the grosser kind, at least, has any part in the development either of sarcoma or of carcinoma. Granted that the figures are very uncertain and clinical history and careful observations lacking, the small percentage of cases in which trauma is associated with the formation of tumors can only be due to a coincidence. It might, of course, be claimed that the tumor, — carcinoma or sarcoma, — had been latent before trauma, and that the trauma merely hastened the growth of the tumor. This is capable neither of proof nor of disproof and must remain for the present a matter of belief and not of knowledge. Experimentally, so far as can be seen, convincing testimony has not been brought forward in either direction, but, as we must constantly keep in mind, no experimentation of any kind has as yet been able to produce an experimental case of malignant growth. The question of traumatism is, of course, still much discussed and it is surprising to note the lengths to which some authors are prepared to go. Herzfeld,[2] for instance, concludes his work with the sentence, "Ohne Trauma, kein Tumor" (No tumor

[1] Nos. 81, 104, 115, 158, 161, and 177.

[2] Tumor and Trauma, Zeitschr. f. Krebsforsch., Vol. 3, 1905, p. 73.

without trauma). One interesting case is reported by Schöppler,[1] in which a fall down stairs with severe contusion of the left mamma was supposed to have given rise to a carcinoma, that portion of the breast having been, supposedly, healthy before trauma. It was quickly operated and the diagnosis corroborated by the microscope. The author considers this a convincing proof of the development of a carcinoma from a single traumatism. The writer does not think that he has proved his case, since, in order to have absolute proof, it would be necessary to have demonstrated, microscopically and otherwise, before the fall, that the portion of the breast affected had been entirely healthy. One must coincide with Boström[2] in so far as he, with other authors, claims that no malignant tumor can be developed after a single traumatism, from tissue previously healthy. It is not possible, however, to accept unconditionally his further statements, that these large traumatisms may act as coincidental irritants and causes of malignant growths.

Besides these blows and contusions, falls and all the grosser forms of traumatisms, those smaller irritations which lead to chronic inflammations and indurations, to hyperplasia, and often to hypersecretion and hyposecretion of the tissues, must be considered under the general head of traumatism. On this subject there is also a very large literature which cannot be mentioned here. A part of it will be found in Schöppler.[3] Besides the usual standard works, there are also the publications of Brosch,[4] Schuchhardt,[5] and Röpke.[6]

Chronic irritations affecting the respiratory organs are numerous and are supposed by many to play a very active

[1] Zeitschr. f. Krebsforsch., Vol. 10, No. 2, 1911, p. 219. Einmaliges Trauma und Carcinom.

[2] Traumaticismus und Parasitismus als Ursachen der Geschwülste, Giessen, 1902. [3] Loc. cit.

[4] Theoretische und experimentelle Untersuchungen zur Pathogenese u. Histogenese der malignen Geschwülste. Quoted after Wolff, loc. cit.

[5] Beiträge z. Entstehung des Carcinoms aus chronischentzündlichen Zuständen der Hautdecken und Schleimhäute, Volkmanns Samml. klin. Vortr., No. 257, 1885.

[6] Arch. f. Klin. Chirurgie, Bd. 78, 1905, H. II.

part in the causation of tumors of the lung. Such causes are supposed to account for the predominance of males over females in the occurrence of tumors.[1] It is very generally stated that the right side is the favorite localization of carcinoma of the lung, and this is supposed to be in consequence of the anatomical and physiological conditions. The right bronchus is shorter and wider than the left, its course is considerably straighter, and it seems natural enough that irritating substances, both chemical and mechanical, are aspirated more easily into the right than into the left bronchus. The following figures calculated from Tables I and II seem to show that for carcinoma there is a predominance in favor of the right side amounting to thirty-one cases. For sarcoma, on the other hand, there seems to be a predominance in favor of the left side. The figures calculated from Table III show no predominance of either side.

CARCINOMA		SARCOMA	
Right side	188	Right side	36
left	157	left	51
both	18	both	2
doubtful	3	not stated	5
not stated	8		94
	374		

Comparison of these figures shows results so inconstant and differences so slight that it would not be wise to build any theories thereon. A. Fränkel[2] comes to a similar conclusion, though based on a much smaller material.

TUBERCULOSIS. The authority of Rokitansky for a long time sustained the dogma that carcinoma and tuberculosis are incompatible diseases; in other words, that where tuberculosis is found a cancer cannot develop. Another view, at one time popular, is expressed by an aphorism of Crazet[3]—"The cancerous easily become tuberculous, but the tuberculous do not easily become subject to cancer." Actual

[1] Conf. p. 22, Chap. III. [2] Loc. cit.

[3] Coincidence et rapport du tuberculose avec le cancer, Thèse de Paris, 1878.

experience has since shown, not only that carcinoma, especially of the cancroid variety, is sometimes found in a tuberculous cavity, but that ordinary pulmonary tuberculosis, with breaking down of tissue and formation of cavities, as well as miliary tuberculosis and localized tuberculosis in other organs, may be associated with pulmonary neoplasms. In some cases the diagnosis of associated pulmonary neoplasm and tuberculosis has been made during life. A selection of cases taken from the collected material will serve to illustrate the association of malignant growths and tuberculosis. Tumor was present in every case, whether expressly mentioned or not.

TABLE I

54 Cohn	Autopsy	Tuberculous cicatrix in right apex and in Bauhini's valve
87 Friedlander	Autopsy	Cancer in left bronchus and tuberculous cavity left lung
98 Gougerot	Clinical	Pulmonary tuberculosis of old standing
106 Harbitz	Clinical	Tuberculous family history
257 Perrone	Sputum	No tubercle bacilli
	Autopsy	Tubercular cavity at left apex, wall of cavity penetrated by tumor
295 Sehrt	Autopsy	Carcinoma right bronchus, extensive ulcerative tuberculosis
343 Wolf	Clinical	Chronic phthisis
	Autopsy	Tubercular cavity left lung and tumor
344 Wolf	Clinical	Chronic phthisis
	Autopsy	Tubercular cavity right lobe and tumor
346 Wolf	Clinical	Signs of pulmonary phthisis
	Autopsy	Tumor left apex, miliary tubercles over right pleura
348 Wolf	Autopsy	Tumor of right upper lobe surrounded by fresh miliary tubercles, both suprarenals tuberculous, tuberculous ulcer in ileum
349 Wolf	Autopsy	Nodules root of right lung, excrescences on membrane of larger bronchi, bifurcation surrounded by large tumor, fresh miliary tuberculosis of both lungs
350 Wolf	Autopsy	Tuberculous lobe, tuberculous pleuritis
356 Wolf	Autopsy	Carcinoma of main bronchus, miliary tubercles in liver
359 Wolf	Clinical	Anorexia and emaciation followed by signs of right pulmonary phthisis
365 Wolf	Clinical	Pulmonary phthisis
373 Wolf	Clinical	Symptoms of tuberculosis with bacilli
	Autopsy	Lesions of old and more recent phthisis
374 Wolf	Clinical	Diagnosis first as tuberculosis, then as syphilis

TABLE II

36	Hildebrand	Tubercle bacilli in sputum
79	Schnick	Tubercle bacilli in sputum

The cases will probably be much more numerous in future, in proportion to the increasing attention given to this subject at autopsies and microscopic examinations. Some authors appear to take a somewhat extreme stand regarding the relation between tuberculosis and tumors generally, and of tumors of the lung especially. For instance, Aronson [1] cites twenty-two cases of his own practice in which tuberculous patients had one parent or both suffering from carcinoma. He even goes so far as to suggest the possibility that the tubercle bacillus under favorable conditions might produce carcinoma, and refers to the lupus carcinoma as the connecting link between tuberculosis and carcinoma. It is sufficient to quote the following sentence: "The phthisical diathesis is not only inherited from parents suffering from tubercular phthisis, but also from those suffering from carcinoma. Etiologically considered, carcinoma, lupus, tuberculosis, all these belong most probably to a single family." As a counterpart to these exaggerated statements, Bayha [2] describes the so-called lupus epithelioma and declares this form of epithelial proliferation in no wise cancerous or malignant. He shows that genuine carcinoma develops much oftener on active and fresh lupus than on lupus scars. The proclivity of carcinoma to develop from lupus, and especially from lupus scars, has been mentioned so often as a fact beyond dispute that it is important to note the results of Bayha's investigation. He says distinctly that there is no direct transition from lupus to carcinoma, but that the malignant epithelium proliferates into the interpapillary depressions. Williams [3] reiterates his view that as tuberculosis declines, carcinoma necessarily increases. It is also his belief that the systemic depreciation that follows as a conse-

[1] Beziehungen zwischen Tuberculose und Krebs, Deut. Med. Woch., 1902, No. 37, p. 842.

[2] Über Lupus Carcinom, Bruns, Beiträge zur Klin. Chir., Vol. III, 1888, p. 1.

[3] Loc. cit., pp. 337 ff.

quence of fresh tuberculosis, and even of tuberculosis only recently healed, is an undoubted factor in the etiology of cancer. On the other hand, he readily agrees to the fact that while a considerable amount of old, healed, calcified tuberculous products may be found associated with neoplasm in the lungs, this association has no further meaning than that, cicatrized tuberculosis being so extremely common, the ordinary percentage is also found in the cancerous. Furthermore, F. P. Weber and many others suggest that old, quiescent tuberculous foci, not yet completely cicatrized, may be again started into activity by the local as well as systemic effect of the cancer, which naturally tends in a great measure to lower the patient's vitality. This, however, is a speculation of which we know nothing.

The subject of tuberculosis in its relations to carcinoma should not be closed without mentioning the theories of Kurt Wolf.[1] Wolf distinguishes closely between bronchial carcinoma and carcinoma of the lung proper. Of the latter he reports nine cases, of carcinoma of the bronchus twenty-two.[2] He points out that bronchial carcinomata are nearly always found in those places which are most subjected to slight, but chronic, irritations, especially on the right side and more particularly near the bifurcations. He does not so much refer to the tracheal bifurcation, but more to the bifurcations of the second, third, fourth, and following orders. Naturally, all the irritations of aspiration, of dust, tobacco, and so on, as well as coughs, are apt to centre about these points. It is there that Wolf most frequently finds very small melanotic lymph nodes which, even at a very early stage, are tuberculous. Sooner or later a minute perforation into the bronchus takes place, into which the melanotic contents of the little node are discharged ("Pigmentdurchbruch"). The lymph nodes on the down track toward the hilus of the lung, and of the hilus itself, become enlarged in the course of the process. It is Wolf's contention that these little melanotic lymph nodes are apt to be tuberculous; that

[1] Wolf, Der Primäre Lungenkrebs, Fort. d. Med., 1893, Vol. 13, Nos. 18 and 19.

[2] Conf. Table I.

when penetrating into the bronchus or developing at the root of the lung they act as a chronic irritant at the localizations most exposed. This "Pigmentdurchbruch,"[1] Wolf claims, is sufficient, in persons hereditarily predisposed, to start the development of malignant growth. This malignant neoplasm then proliferates in the bronchus first affected, travels along the ramifications of the bronchial tree, penetrates into the lungs, and forms more or less extensive tumors. This theory of Wolf has been the subject of some discussion, but has not been generally adopted. The presence of the tubercle bacillus or any active tuberculous process has never been definitely demonstrated in these minute lymph nodes or their further development. He finds, out of the thirty-one cases which he reports, eleven cases which exhibit, not cicatrized and inactive, but mostly fresh and active tuberculous processes, by the side of indubitable primary malignant neoplasms in the lungs. This, however, does not suffice to prove his ingenious theory.

That carcinoma does occur on various cicatrizations, especially of the skin or mucous membrane, is a fact. It is only necessary to refer to the carcinoma on lupus, previously mentioned in this connection, on ulcer of the stomach, on leukoplakia, gall bladder, etc. This form of precancerous affection evidently is not concerned in lung tumors, unless we except the theories of Wolf, just briefly outlined, or of some other authors, who find in tuberculous cicatrizations or tuberculous ulcers a formative irritant for the development of carcinoma.

An attempt has been made to obtain some knowledge of the duration of carcinomatous disease from Table I. Reliable values are, however, not easily obtainable, and it is possible to give only an approximate and very defective notion of the duration of primary carcinoma of the lung. The reasons for this are obvious. Many authors neglect to give any data from which the duration might be deduced, and the patients themselves are often so little self-observant and so careless

[1] This "Pigmentdurchbruch," so far as the writer knows, has been demonstrated only a single time.

of their physical condition that they seek medical aid long after the first appearance of symptoms, the date of which, therefore, can no longer be fixed. Finally, the first appearance of symptoms does not necessarily coincide with the beginning of the disease. Among the 374 cases tabulated in Table I, there are no means of calculating the duration in 230 cases. The longest duration given is five years, the shortest two weeks.[1]

[1] For details, see Appendix A.

CHAPTER V

PATHOLOGY

THERE is an old aphorism saying that those organs most disposed to secondary tumors are least disposed to the formation of primary neoplasms. The lungs are undoubtedly a favorite localization for secondary tumors, but primary neoplasms are by no means rare. All the types of tumors represented in the onkology of other organs may also be found in the lungs.

The *gross appearance* is not uniform or characteristic. It differs according to the peculiarities in each individual case. For carcinoma of the lungs, the older writers distinguish only between encephaloid, or what they called medullary, cancer ("Markschwamm" and fungus hæmatodes) and the infiltrated form, the names being given merely to indicate external differences. Jaccoud[1] mentions that primary cancer of the lung is nearly always of the encephaloid variety and is seen either "en masse" or in a more infiltrated form. He considers the "cancer en masse" as the more frequent. It is not easy to determine just what kind of tumor, — sarcoma or carcinoma, — Jaccoud had before him. A much greater variety in gross appearance of this class of tumors is now recognized.

One form that occurs occasionally is that of a *single nodule*, usually quite small, surrounded perhaps by a few minute miliary nodules deeply buried in the lung tissue of one lobe, producing only very slight or possibly no symptoms during life, and as a rule discovered by mere accident at autopsy. These cases are rare. The writer has seen two.

There is the so-called miliary form of carcinosis, which in

[1] Jaccoud, Leçons de Clinique médicale, 1871–72, p. 454, Cancer de poumon; Traité de pathologie interne, Vol. 2, p. 120.

the gross resembles very nearly an eruption of miliary tubercles.[1] There is perhaps this difference, that the little nodules are somewhat larger than the tubercles and have not the peculiar grayish translucent appearance, but are more whitish and generally distributed along the lymphatics.[2] The reader is referred, for a history and description of the acute miliary carcinosis in general, to J. Wolff.[3] As for the lungs, there seems to be no doubt that a miliary carcinosis actually exists, as Rokitansky[4] and Elisberg[5] hold, but it is probable that these cases are not always primary. It is very much more likely that they are secondary to some small tumor that—possibly owing to lack of symptoms, possibly because hidden away in the depths of some bulky organ — was not detected.

The *nodular* form of primary carcinoma of the lung as a rule involves in its beginnings only a portion of one lung, while metastatic carcinomatous nodules in the lungs are apt to be distributed throughout both lungs. The nodules are found of varying sizes, from that of a cherry pit or walnut to that of an egg, small apple, or even a human fist. They are not usually confluent, but are separated from each other by lung tissue. The boundary between the tumor and the lung is sharply defined. As the process continues, the lung tissue intervening between nodules often becomes involved in secondary inflammatory and degenerative conditions, and the nodules, as they increase in size, may merge one into the other. Jaccoud,[6] and since his time others, have been of opinion that cavities and breaking down of tissue within these nodular carcinomata do not occur, or at all events are very rare. On the contrary, however, the material collected in Table I will show that the formation of irregular cavities, especially in the larger nodulated tumors, is a common occurrence. The gross appearance on section of these nodules varies according to the kind of tumor and the condition in which it happens to be, and it is therefore not

[1] This form was first described by Demme, Schweiz. Monatschrift f. prakt. Medizin, Jahrg. III, 1858, No. VI.

[2] Conf. Wunderlichs Archiv., 1857.

[3] Loc. cit., Vol. II, pp. 398 ff.

[4] Loc. cit., 1856, Vol. I, p. 255.

[5] Table I, No. 80.

[6] Loc. cit.

possible to present a uniform and generally applicable description. One may be sure, however, that besides the usual grayish-white or yellowish or pinkish-white tumor material there may be found pathologically altered bronchi and vessels, bronchiectatic dilatations, and, as has been said, occasional cavities. The cavities have ragged, irregular walls, consisting of tumor. Stumps of vessels and bronchi often protrude into them from the walls. The cavities usually contain detritus from tumor material, old or fresh blood, mucus, and so on.

The *infiltrating* form. This form is very common. Separate nodules, large and small, are rare. The tumor, usually starting from a bronchus, penetrates the bronchial wall and infiltrates the lung along the bronchial as well as the venous, arterial, lymphatic, and even nerve ramifications.[1] This type is subject to many variations, according as the infiltration happens to proliferate mainly along the preformed track of the bronchial ramifications or extends down to the root of the lung, involving not only larger bronchi but also the bronchial, tracheal, and mediastinal glands. It thus forms, besides extensive pulmonary infiltrations, considerable masses of tumor at the root which, in their effect upon larger bronchi, trachea, large vessels, and other mediastinal organs, cause bronchiectatic dilatations, atelectatic areas, even gangrene, in the lungs, and all those symptoms, to be discussed later, which pertain to intra-thoracic growths in general.[2]

There is another type of infiltrating tumor affecting only a portion of a lobe. This starts as a rule from smaller bronchi or bronchioli; the infiltration is sharply defined against the normal lung tissue, and is so dense that within the region of the tumor scarcely any lung tissue can be found. The entire area is taken up by tumor in which only a few arteries and veins and some slight dilated bronchi are visible.[3]

In Plate 2 the destruction of almost the entire lung, from top to bottom, is well shown. There is little healthy lung tissue, for nearly the entire lung is gone and the pulmonary tissue replaced by tumor, at first creeping along and

[1] Stilling, Table I, No. 310. [2] Conf. Frontispiece. [3] Plate 1.

infiltrating the lung tissue, then degenerating and breaking down into cavities, etc., as described.

The gross forms thus far described apply in general only to carcinoma of the lungs. The rare cases of sarcoma may assume similar macroscopic forms and it will then become difficult to distinguish sarcoma from carcinoma without the aid of the microscope. There is one gross form, however, that is, to all intents and purposes, peculiar to sarcoma. This form appears as very large tumors with fairly homogeneous structure, sometimes containing cavities, but comparatively rarely, and *never when the tumor is a lympho-sarcoma*. These growths may become so large as to occupy the entire half, or more, of the chest. That portion of the lung which is not destroyed and replaced by tumor remains as a mere shell around this growth. Heart, diaphragm, mediastinal contents may be extensively displaced.

This very brief and necessarily incomplete sketch of the mere gross appearances will suffice to show how varied and complicated, how difficult of interpretation, are the post-mortem pictures presented by lung tumors. Sometimes the picture as seen by the naked eye cannot be recognized as tumor at all, and the lesions as shown at autopsy will be interpreted as inflammatory or degenerative processes, — for instance, as chronic, indurative, or pneumonic lesions. It follows from this that at every autopsy, even at those where there is no reason to suspect the presence of tumor, a microscopic examination according to modern methods is necessary for every portion of the lungs that does not appear absolutely sound and healthy.

Passing from the macroscopic to the microscopic study of primary malignant neoplasms of the lung, manifold difficulties in determining the histological structure of the tumor, its interpretation and classification, are encountered. As the simpler group of these tumors, and presenting fewer of these difficulties, *sarcoma* will be first discussed. Hertz[1] goes so far as to deny the existence of primary sarcoma of the lung, claiming that every sarcoma found in that organ is

[1] Neubildungen der Lungen in Ziemssens Handbuch, 1874, Vol. 5.

secondary. It must be admitted that primary sarcoma of the lung is a great rarity. The writer has not had the good fortune to observe a single case. Nevertheless, it has been attempted here to show that the relation of primary sarcoma of the lung to primary carcinoma of that organ does not differ from the relation which sarcoma bears to carcinoma in general.[1] This conclusion is based on a collection of ninety-four cases from the literature on the subject, ninety of which have been listed in Table II. It is quite possible that a number of those set down as doubtful in Table III are genuine sarcoma. It is possible also, and very probable, that a great many cases have not been recognized and therefore not recorded.[2] As more attention is paid to this subject, reports of cases are published in greater number than would have been thought possible some years ago. It would have been easy to increase the number of cases on Table II to more than one hundred. All this shows that the belief in the extreme rarity of sarcoma has been somewhat exaggerated.

It has been shown above that the gross pictures presented by sarcoma may differ so slightly from those offered by carcinoma that microscopic examination alone would serve to differentiate between the two. It may, however, be said roughly that sarcoma has a greater tendency to spread toward the root of the lung, and involve from there the mediastinal lymph nodes and other organs, than has carcinoma. Melanotic sarcoma is extremely rare, — there is, in fact, some doubt in the writer's mind that it occurs at all. The dark anthracotic pigmentation of lungs and bronchial glands, pathologically more prominent perhaps, may erroneously lead to the suspicion of melanosis. The very large and massive tumors occupying a great portion of the chest have just been referred to. They are occasionally subject

[1] According to Williams (loc. cit., p. 377), 54.5% of all tumors are carcinoma, 9.4% sarcoma, 24.7% non-malignant, and 11.4% cysts. These figures corroborate the above statement.

[2] A quotation from Menetrier (Lubin, Thèse de Paris, 1909, Contributions à l'Etude du Sarcome primitif du Poumon) seems apt enough in this connection: "Le cancer n'est pas une forme morbide primitive; c'est un aboutissant d'états pathologiques multiples, antérieurs et préparatoires."

to osseous and especially to calcareous degeneration.[1] A scrutiny of Table II shows that about half of the cases tabulated are of this massive type. Between these and the more infiltrating forms there are, of course, all manner of transitions. An especially interesting case came to hand after the Tables were finished. In this case the entire left half of the chest was filled by a voluminous mass, dislocating the heart, impinging on the right lung, and depressing the liver. The left lung was almost completely replaced by a huge tumor which pushed the remnants of the pulmonary tissue upward. The tumor contained a cavity in the midst of soft tumor material. The duration of the disease was almost three and a half years.[2] A most interesting case, also, is that reported[3] of a male thirty-three years old, who entered the hospital in July, 1896. He had been sick since the previous December with cough, hæmoptyses, pains in right chest, and in addition bronzed skin and bluish scleræ. In February, 1896, he was seized with a severe pain in the right leg, especially in the knee, which lasted until death. The entire right side was more painful than the left; no pigmentation in the mouth; percussion absolutely flat over entire right anterior chest, and resistance much greater than normal; some cavernous breathing below the right clavicle, otherwise absolute silence over the whole right posterior lung; sputum contained nothing characteristic. The autopsy showed an enormous sarcoma of the right lung, many metastases of liver, pancreas, etc. Microscopically, a giant celled sarcoma of mixed type. A diagnosis of primary tumor of the lung had been made during life, but at autopsy the authors were inclined to consider the lung tumor secondary and the tumor in the femur as primary; in the first place on account of its microscopic structure, — the mixed giant celled sarcoma, — the giant cell being more common in

[1] Chiari, Table III, No. 4.

[2] Heilbron et Sezary, Sarcome primitif du poumon, Bull. et Mém. de la Soc. Anatom. de Paris, Année 85, No. 7, p. 758.

[3] Packard and Steele, Case of Sarcoma of the Lungs, with symptoms of Addison's disease with involvement of suprarenal capsules. Med. News, 1897, No. 11.

bone; furthermore, the advanced condition of degeneration in the femur beyond that of the lung. For this reason the authors claim the tumor in the lung as secondary. This may be correct, but the true facts cannot be obtained with certainty. If it is secondary in the lungs, we have the very unusual, as far as the writer knows, the unique, occurrence of a secondary sarcomatous deposit involving only a single lung and assuming such huge proportions as almost to occupy the entire lung. It might be interesting to refer here also to a publication by Eckersdorff.[1] According to his statistics 1.5 per mille of all autopsies are primary sarcoma of the lungs. Eckersdorff finds up to the year 1908 only four cases of primary sarcoma of the lungs. He publishes two cases, one of a man fifty years old living rather a wild life. In November, 1902, in joke, a friend gave him a blow between the shoulder-blades which led to a strong desire to urinate. Next day he felt still much affected, but on second day entirely well again. Soon thereafter he began to be hoarse, had pains in region of heart and intermittency of pulse. The most interesting part of the later history is the rapid change when, after considerable dyspnœa, irregular and rapid pulse, urine without albumen, enormous thirst, the patient would suddenly get better. It was not until late in the course of the disease that total dulness of left lung with abolished breathing sounds was discovered. This dulness disappeared quickly with the exception of one place. Later on there was a sudden disappearance of the pains. Death February 7th in collapse. The diagnosis during life was: probable neoplasm in the lung. The anatomical diagnosis, an annular carcinoma of the left main bronchus with obstruction of this and the formation of metastatic deposits in the lymph nodes and on the heart, œdœma of both lungs, pneumonia of the left lower lobe, and dilatation of both ventricles of the heart. Microscopical examination showed that it was not a carcinoma, but a sarcoma of small round cell type. The

[1] Zwei Fälle von primärem Sarkom der Lunge, Centralbl. f. allg. Path., Vol. 17, 1906, p. 355.

histogenesis cannot with certainty be determined. The author thinks that the connective tissue of the bronchial mucosa is the place of origin. He does not express a positive opinion as to the causal effect of the blow. In a second case the origin is referred to the interalveolar septa. The author expresses the hope that in future the sputum may be studied more carefully in such cases.

Another case which appeared after the Tables were finished may be mentioned here, though not a sarcoma, the interesting feature of it being the observation of the blood. Hæmoglobin is not mentioned, but in the first blood count the red cells are reduced to 3,886,100 and the leucocytes are increased to 19,840, of which the polynuclears are seventy-nine per cent. A second blood count also does not give the hæmoglobin. The red cells have dropped down to 2,926,400, the whites have increased to 24,800, and the polynuclears are now eighty-six per cent. A large tumor is found with cavities supposed to involve the larger bronchi and the hilus. The microscopical analysis shows a cancroid. Origin from the bronchus is nevertheless assumed.

The frequent occurrence of primary sarcoma of the lungs in the form of huge and ponderous tumors is also corroborated by Duran.[1] Schech[2] states that when in the right lung, the favorite seat of the tumor is the upper lobe, while in the left lung the favorite seat of tumor is the lower lobe, and that he has seen the tumor primary in both lungs only twice. Looking over Table II in regard to this point, one will find that there is no such difference, but that tumor in the right upper or left lower lobe, and the converse, occurs with equal frequency. There are five cases cited in the Table where both lungs are affected. The duration of sarcoma of the lungs does not seem to differ very materially from that of carcinoma. There are fifty-two cases out of the ninety in Table II from which some approximation as to their possible duration may be reached. Among these fifty-two, the shortest period of duration is one month and the

[1] Du sarcome primitif du poumon, Thèse de Paris, 1893.
[2] Table II, No. 78.

longest six years, the average being about four and a half months, as compared to that of carcinoma, the average for which is two and a third months. It is evident that these averages have no real significance, and the only legitimate deduction from the figures is that primary carcinoma and sarcoma of the lungs are of indefinite duration, running at times a very rapid course and again assuming the character of chronic disease and lasting for many years.[1]

The histology of primary sarcoma of the lungs offers in the main nothing peculiar or characteristic, but practically corresponds with the histology of sarcoma of other organs. It has been said[2] that the spindle cells occur more frequently than any other type of cell. Examination of Table II in regard to this point shows only sixty-eight cases available, as in the remaining twenty-three there was no clear statement as to the character of the cells. Out of these sixty-eight cases just half were of the typical uncomplicated round celled variety, fourteen only were spindle celled, seven uncomplicated lympho-sarcoma, and there were also a few mixed tumors, such as lympho-sarcoma with small round cells, with spindle cells, etc. It seems, therefore, that round celled, and not spindle celled, sarcomata are by far the most frequent. Occasionally, giant cells are found.[3] There are found, also, the usual combinations, such as myxo-sarcoma, fibro-sarcoma, and others; various degenerations, as mucoid, colloid, more frequently fatty, and also calcareous and osseous, attributable principally to the stroma; occasionally there are cystic forms.

The histogenesis is still obscure. It seems certain that a great many of the pulmonary sarcomata take their origin from the root of the lung, probably in one or the other of the smaller or smallest of the peribronchial glands, growing from there, as mentioned before, along the track of the bronchi, and at an early period penetrating a larger or smaller

[1] For further details regarding duration of primary sarcoma of lungs, see Appendix B.

[2] Schech, loc. cit.

[3] Packard and Steele, loc. cit. Also Colomiatti, Table II, No. 14. Also Klemm, Table IV, No. 10.

bronchus, obstructing it, and thus continuing in its course through the lungs, the tissue of which it destroys on its way. It may also, it is said, penetrate through the pores of the septa directly into the alveoles. The large massive tumors almost invariably start at the hilus. It is assumed by many, though not yet conceded by all, that sarcoma may develop from the interalveolar septa in the lung itself. The septa, at one or several spots becoming sarcomatous, may compress the pulmonary alveoles and fill with tumor material what is left of the air-vesicles, thus forming nodules of varying size which, again merging into similar nodules, can form considerable tumors. The lung tissue in the immediate environment of these nodular tumors is usually quite healthy, or evidences only minor changes. Microscopic examination may show remains of septa or the latter may have been destroyed altogether. As a rule there is no open communication with the bronchus, but bronchial remnants are seen within the tumor. In some instances the sarcomatous tissue does not completely destroy the septa, so that the alveolar structure in some places at least remains distinctly visible. The air-vesicles are then filled with a mass of polymorphous cells which, according to the individual bias of the observer, may pass either for epithelial cells or for deformed sarcoma (round) cells or for endothelial cells. The dispute concerning endothelium will be touched upon later. For the present it may be said that some authors consider the endothelium to play a considerable role in the histology of sarcoma, and Burkhardt,[1] after extensive researches, thinks that sarcoma and endothelioma are not to be separated from each other, inasmuch as every sarcoma, besides the proliferating cells of the connective tissue, contains a greater or less proportion of endothelia of the lymph spaces as well as adventitia cells. All sarcoma are, therefore, according to him, more or less endothelioma, and only according as the connective tissue cells or the endothelia react stronger do the various types stand out. This is, of course, a very extreme point of view

[1] Sarkome und Endotheliome nach ihrem path.-anatom. und klin. Verhalten, Bruns Beitr. z. klin. Chir. 36, 1902.

and will have to be discussed later when endothelioma is touched upon. The microscopic picture often speaks for this theory, as it presents distinct alveolar structure with much enlarged septa consisting of spindle cells and alveoles filled with polymorphous cells. It is this type of tumor that probably comes under the head of what Virchow termed *carcinoma sarcomatodes*.[1] The case of Weichselbaum[2] seems to be a true adeno-sarcoma. Is it not possible that this kind of tumor resembles those produced experimentally by Ehrlich and his school, in which the stroma of a carcinoma was ultimately converted into genuine spindle or round celled sarcoma?

Carcinoma. The epithelium found in the lungs (lungs being taken in the broader sense and including the bronchi) consists of *cylindrical epithelium*, ciliated as well as not ciliated. The ciliated cells form the lining of the mucous membrane of the larger bronchial tubes. As with continued dichotomous division the branches of the bronchial tree become smaller, so the high ciliated cells become lower, the cilia gradually disappear, and the very smallest bronchioles are simply lined by a small, low, cuboid epithelium without cilia. The bronchial epithelium in the minutest bronchioles is by gradual transformation changed into the respiratory and alveolar epithelium. In the adult this consists of *flat, squamous* cells resembling endothelium. They line the septa and the pulmonary alveoli. The endothelium itself, those cells which form the inner coating of the lymph vessels and spaces, must be presently considered somewhat more in detail, as it is still a subject of dispute. Cylindrical epithelium is also found in the bronchial mucous glands. This has no cilia and differs in no way from the ordinary cylindrical cell as found in glands.

Considering only the very limited group of cells that contribute to the structure and formation of the carcinoma of the lung, it is often surprisingly difficult to distinguish the kind of epithelial cells that make up the tumor, and its

[1] Böhme, M., Primäres Sarco-Carcinom der Pleura, Virchows Archiv., Vol. 81, 1880, p. 181.

[2] Table III, No. 94.

structural peculiarities, and to understand the histogenesis. The enormous plasticity of the epithelium, the influence which territorial limitations, intense proliferation, pressure upon each other, and various other intra- and extra-cellular changes bring to bear upon the cells, — all these features conspicuously increase the difficulties. It may really appear at times as if there were no specific kinds of epithelium, but that the epithelial cell, according to merely extrinsic conditions, might assume any form, cylindrical cells being transformed into pavement cells, pavement cells into horny pearls, etc. One is frequently at a loss to decide whether, in the section before him, the cells are of epithelial or connective tissue origin, whether it is a carcinoma or a sarcoma. Fränkel, in the discussion of Simmond's paper,[1] states emphatically that great difficulty is often experienced in distinguishing between carcinoma and sarcoma, owing, on the one hand, to the alveolar structure of the lung simulating carcinoma, and on the other hand to the almost limitless proliferation and change of form of the epithelia suggesting sarcoma. A good example of this is shown in Plate 3. Here the cells are so crowded, the proliferation is so rapid, that it would be impossible at the spot photographed to make any other diagnosis than that of a small round-celled sarcoma. No one would easily believe that these cells are mere transformations of epithelial cells and that the tumor is a true carcinoma. Plate 4 shows the same section with a higher power. One sees a great variety of polymorphous cells, some of which resemble epithelial, others sarcoma cells. In one spot a mitosis is plainly to be seen. Plate 5 is a section of the same tumor from another place, photographed with a moderate magnification, which plainly demonstrates the alveolar structure, the typical stroma, and in several places undoubted epithelial cells. There can be no hesitancy in calling this tumor a carcinoma. Plate 6 is a section from the kidney of the same patient, photographed with high power and showing most

[1] Über die Histologie des prim. Lungenkrebses, Mün. Med. Woch., 1896, p. 189.

beautifully a few undoubted epithelial cells just after their entrance into Bowman's Capsule. This picture may serve to remove all possible doubt as to the true nature of the tumor.

The various well-known types of carcinoma are all represented. The *carcinoma simplex*. Plate 7 is a good illustration of this. The alveolar structure is very plain, the alveoles varying in size, lined with cuboid or cylindrical cells and filled with polymorphous cells jumbled together, compressed out of shape and partly degenerated (horny, mucoid, colloid, fatty degeneration, etc., are frequently met with). The stroma is usually rich in cells and here and there a lymph space filled with epithelial cells is seen. It is very interesting to note in the picture a tolerably large alveole projecting its epithelial material directly into a lymph vessel. Plate 8 shows the typical glandular carcinoma without any distinctive features, and consisting mostly of flat and cuboidal epithelial cells with very little stroma. In this section there is nothing to suggest the origin of the tumor from the lung. Plate 9 shows the same form of carcinoma with smaller and more plexiform alveolar structure, more voluminous and firmer interstitial tissue, and a very plain demonstration of the infiltration of lymph vessels and spaces from the alveolar contents. In Plate 10 is shown a good example of a cancroid with the characteristic horny epithelial pearls. The basilar lining of cuboid cells is in this section not very plain.

The *cylindrical celled* carcinoma. Plate 11. The cells are not ciliated. The alveolar structure is evident, the alveoles varying in size. The larger ones are about the size of a moderately large bronchus, and it is obvious that they are formed by the confluence of a number of smaller alveoles. The contents of these larger alveolar spaces, sometimes suggesting small cavities, consist of cellular and mucous detritus and scattered epithelial cells in various stages of degeneration. The stroma between the alveoles generally consists of rather soft connective tissue containing moderately abundant connective tissue cells. This form of carcinoma, occur-

ring as it does quite frequently, is considered by many pathologists to be the typical, if not the only form, in which carcinoma occurs in the lungs. It is demonstrable that this type of tumor develops from the cells of the bronchial mucous glands. That this is so was first shown by Langhans,[1] whose views were widely accepted.[2] In Plate 12 there is seen very clearly to the right of the picture a dilated bronchus with mucoid detritus in its interior and a partially detached epithelial lining. In the middle of the picture are shown the bronchial epithelial glands, the majority of them unchanged, others just at the beginning of carcinomatous proliferation. Toward the left are some alveoles lined with cylindrical cells and the transition from proliferating bronchial mucous glands to carcinomatous alveoles is clearly perceptible. Plate 13 illustrates similar conditions. The bronchial cartilage is in parts destroyed and there are similar carcinomatous degenerations as in the preceding figure. Some of the alveoles, evidently originating from degenerated bronchial mucous glands, contain carcinomatous epithelium, not typically glandular, but exhibiting the usual character of pavement epithelium.

Carcinoma may also develop from the surface epithelium of the bronchi. It is still a matter of some dispute what kind of cells are characteristic of this form of carcinoma. It is thought by competent authorities that the surface epithelium of the bronchi develops a carcinoma of alveolar structure with polymorphous and polyedric cells that are, in the great majority of cases flat, but sometimes varying numbers of cylindrical cells are mingled with them. Such forms of carcinoma are exemplified by Plates 8 and 9. It was contended by some[3] that the carcinoma just described might develop from the bronchial mucous membrane, but might also take its origin from the flat epithelium of the pulmonary alveoles. This contention caused considerable

[1] Virch. Arch., Vol. 53, 1871, p. 470.

[2] Chiari, Table I, No. 51; Ebstein, Table I, No. 75; Stilling, Table I, No. 310, and others.

[3] Ehrich, Table I, No. 77, and others.

discord among the few pathologists who studied the subject. A number of these without hesitation considered every pulmonary carcinoma, where they found flat polyedral epithelium, as necessarily derived from the alveolar cells. A little closer study showed the untenable character of these theories. It is unnecessary to enter into all the details of the discussion. Some considered the flat epithelium in pulmonary carcinoma extremely rare, others considered it very frequent. Fröhlich,[1] for instance, found it twelve times among sixteen cases. According to the statistics of Watsuji,[2] 32.2% of all pulmonary carcinomata are of the pavement cell variety. There is, however, no evidence that these carcinomata develop from the pulmonary alveoles. On the contrary there is considerable evidence against the supposition. It is now held that carcinoma starting from the pulmonary alveoles is extremely rare, and some go so far as to deny its existence altogether. Marchand and his pupils[3] succeeded in demonstrating beyond doubt a tumor starting from the alveolar respiratory epithelium. The tumor in question would hardly be recognized as tumor by the naked eye, but rather suggested the opaque and somewhat translucent tissues as they occur in chronic bronchopneumonia, and the structure as shown by the microscope was a great surprise. It was found that the tumor was made up of cylindrical cells with more or less of a papillary arrangement. As the respiratory epithelium in the embryo is of the cylindrical type, the occurrence of cylindrical cells in these growths is not surprising. The tumor is probably congenital. Plate 14 shows a section of this sort of tumor, in which remnants of alveolar structure, with somewhat irregular but nevertheless recognizable high cylindrical cells, can still be traced. There are perfectly clear patches showing papillary arrangement.

Neglecting in this place all further detail, it may be briefly stated that it is at present the common consensus of opinion, and probably justly so, that the great majority of

[1] Table I, No. 88.

[2] Zeitschr. f. Krebsforsch., Vol. I, p. 445.

[3] Kretschmer, loc. cit.

primary carcinomata of the lungs develop from the bronchi, and that a cancer of the lung is, taken strictly, a bronchial carcinoma; that, on the other hand, a carcinoma starting from lung tissue itself occurs, but is extremely rare, and is built up, not of flat, but of cylindrical epithelium.

CHAPTER VI

PATHOLOGY (Continued)

ANY attempt to work out the histogenesis of lung tumors leads at once to troublesome questions concerning epithelium, metaplasia, and other fundamental problems about which there exist great differences of opinion in the pathological world. It may be said at once that it is generally impossible to determine the histogenesis of a fully developed lung tumor and it rarely or never happens that we meet with a tumor so small that its very beginnings can be clearly seen. Even the close study of the growing edges of the tumor will give no satisfaction, and any certainty with regard to the histogenetic origin of the majority of lung tumors must, for the present at least, be given up as hopeless. Turning to epithelium, it is at this moment practically impossible to say what "epithelium" really means and what its relations are to other kinds of cells, especially to endothelium. The literature on the subject of endothelium and its relation to tumors, as well as to acute and chronic inflammations in adult tissue and its embryonal history, is really enormous, and no attempt at even a sketch can be made here. The work of Borst[1] in his large treatise on tumors, and his several other separate publications,[2] and the critical compilations of Mönckeberg,[3] go deeply into the question of endothelioma, while Volkmann,[4] and before him Kolaczek,[5] have done fundamental work in the study of these tumors.

Leaving this mass of literature to those specially interested, it is important to arrive, at the very beginning, at some un-

[1] Lehre von den Geschwülsten, Wiesbaden, 1902.
[2] Das Verhalten der Endothelien, Würzburg, 1897, and others.
[3] Lubarsch, Ergebnisse, 10 Jahrg., Wiesbaden, 1906.
[4] Deut. Z'tschrift f. Chir., Vol. XLI, 1895.
[5] Deut. Z'tschrift f. Chir., Vols. IX and XIII, 1878 and 1880.

derstanding of the nature of epithelial cells. It is generally accepted that epithelium assumes various forms differing in morphological structure and in physiological function. The forms recognized by all are: (1) *cylindrical epithelium*, which is differentiated into several species: (*a*) endowed with cilia upon which certain physiological motor functions depend, and (*b*) without cilia, dispersed in a single layer or in several strata, serving as an inner coating to numerous hollow organs, and lastly, (*c*) glandular cylindrical epithelium, to which are allotted duties of secretion and excretion; (2) *flat, squamous, or pavement epithelium*, arranged either in single layers or in numerous strata and modified in its morphological structure according to the physiological function which it is called upon to perform. The lining of numerous internal organs consists of this type of epithelium. The epidermis which protects the surface of the entire common integument is in the main built up of such cells, specially differentiated as to their structure and chemical constitution (kerato-hyalin, intra-cellular structure, and protoplasmatic bridges). No further detailed description of epithelial cells is necessary. Until very recently it was accepted as a fact that the three germinal layers were the dominant factors in the histogenesis of all the tissues and organs in intra- as well as extra-uterine life. All the epithelium that was needed for the viscera of the chest and abdomen was supposed to be furnished by the entoderm. The epithelium of the common integument and of several other organs closely connected with the outer surface is referred to the ectoderm. There is besides this a certain class of flat cells bearing nearly all the hallmarks of genuine flat epithelial cells, which are universally found in the body as a lining of the great lymphatic cavities (pleura, peritoneum, etc.). The inner coat of the arteries and veins and the perivascular lymph spaces, as well as all lymph spaces throughout the body, are lined with this peculiar epithelium. Its origin is said to be from the mesoderm, the mesoderm being the third germinal layer, from which the fibrous and connective tissue, the bones, cartilages, elastic fibres, etc., — aptly

called by the Germans "Stützgewebe," — are said to originate. These cells just mentioned as coming from the mesoderm could not be classified as genuine epithelium and were therefore called by His endothelium. They showed, on the one hand, close connection with the connective tissue cells, with which, indeed, they have much in common, especially the property of forming fibro-plastic cells. There are many tumors that are supposed to be developed from the endothelium and are therefore named endothelioma. These are usually non-malignant, but there are also malignant forms of endothelioma. Borst and his followers have also not infrequently found endothelioma as a primary malignant neoplasm in the lung. The writer himself[1] was at one time convinced of the occurrence of primary malignant endothelioma in the lungs, but has since been forced to change his opinion.

At the present writing opinions as to the embryonal development of the so-called endothelium are extremely perplexing. The doctrine that the endothelium, as well as the connective, osseous, and other specific elements, are derived from the mesoderm, is becoming more and more discredited. Hertwig[2] derives the mesoderm from the primary entoderm, and according to him, at a very early stage independent mesenchym germinal cells emigrate and proliferate in the spaces between the ento- and ectoderm, and thus form the basis for the development of the connective tissue substances and blood. Schultze,[3] on the other hand, derives the mesoderm from the ectoderm, and according to him nearly all the cells of the mesoderm possess considerable mobility of their own, so that they wander through all the organs developed from either of the germinal layers. It will be seen by these two quotations how unsatisfactory as yet the embryonal history of endothelium is. It will also be seen that embryology is tending more and more

[1] I. Adler, Remarks on Primary Endothelioma of the Lung, Pleura, etc., Journal of Medical Research, VI, 1901.

[2] O. Hertwig, Lehrbuch d. Entwicklungsgeschichte, 1896.

[3] O. Schultze, Grundriss der Entwicklungsgeschichte, Leipzig, 1896.

toward giving up the mesoderm as a primary germinal layer and is depending more and more upon the ento- and ectoderm, with only secondary and varying assistance from a secondary mesoderm. It is impossible to go further into details. Let it suffice to say that at present there is little doubt, though the various workers on this subject have not arrived at a uniform opinion as to what cells should be classed as endothelium and what as epithelium, that there is a form of cell which may rightly be called endothelium, which occupies a unique position in so far that it lines the banks of seas and streams of fluid, where it is not only acting as a mere mechanical agent, but has certain other physiological properties which will be touched upon presently.

Suppose the endothelium to be derived from the mesoderm and to be an integral part of the connective tissue system, it follows, and rather absurdly, that a tumor possessing alveolar structure and cells, not to be distinguished from the true epithelial (carcinomatous) cells, — a neoplasm, in short, that acts altogether like a carcinoma, — must be classed among the malignant connective tissue tumors; in other words, must be called a sarcoma. Thus Remak, Thiersch, Billroth, and Waldeyer classed as sarcoma all tumors that develop in localities where normally no epithelium is found. This may in part be responsible for such designations as adeno-sarcoma, alveolar carcinoma, lympho-sarcoma, etc. Köster[1] does not employ the term "endothelioma," but assumes that all carcinomata take origin from the lymph vessels. Of late the opinion is gaining ground that the intimate structure of the tumor is not dependent upon certain phases of embryological development nor upon the morphological relations of the three germinal layers. It is held that whatever tumor possesses carcinomatous structure and behaves clinically as a carcinoma *is* a carcinoma, no matter whether its component epithelial constituents be derived from the mesoderm, the entoderm, or the ectoderm. In other words, it is said that, while the germinal layers are of utmost importance

[1] Die Entwicklung der Carcinome und Sarcome, Würzburg, 1869.

as regards differentiation, topography, and ultimate development and function of the tissues, their influence to a great extent ceases when the organism is complete and the fœtus is fully developed. Extra-uterine pathology should not be tyrannized over by embryology.[1] Klaatsch[2] also points out that the concept of a mesoderm is gradually disappearing and that the ectoderm is of paramount importance. He shows, moreover, the necessity of being guided in one's judgment more by the physiological requirements and functions than by the merely morphological and embryological point of view. He demonstrates convincingly that the morphological character of cells may be changed to a considerable extent, consequent upon changes in the surrounding tissues, especially when gaps in the continuity of the tissues are formed. He is totally opposed to a classification of tumors in their relations to the three germinal layers. It is to be noted that both functionally and physiologically the endothelium appears closely related to typical epithelium.

It is not necessary to go into all the finer distinctions between endothelium and epithelium. It is best, in the opinion of the writer, to agree with Borst that there are tumors undoubtedly taking origin from endothelium, and as the endothelium occupies a peculiar position, on the one hand appropriating to itself some of the functions of epithelium,[3] on the other hand being intimately associated with connective tissue, even forming fibro-plastic cells, it is best to call these tumors by the special name of *endotheliomata*. That there are malignant endotheliomata, we cannot doubt, such perhaps as the much discussed primary cancer of the pleura, concerning which there is still no unity of opinion and a lack of clear and sharp definition. This is

[1] Marchand, Über die Beziehungen der path. Anatomie zur Entwicklungsgeschichte, besonders der Keimblattlehre, Verhand. Deut. Path. Ges., II, 1900, pp. 38 ff.

[2] Über den jetzigen Stand der Keimblattfrage mit Rücksicht auf die Pathologie, Münch. Med. Woch., 1899, N. 6, p. 169.

[3] Haidenhain, Verhand. des X. internat. Congresses, Berl. 1891, Vol. II; also Archiv. f. Physiol. v. Pflüger, Vol. 49, 1891, and Vol. 56, 1894; also Orlow, Recklinghausen, Adler and Meltzer, Meltzer, and others.

shown by the various names, as for instance "lymphangitis carcinomatodes"[1] or "lymphangitis proliferans."[2] As to the lung, however, the writer has not as yet been so fortunate as to be able to diagnosticate an endothelioma of the lung, though Borst and his pupils and others[3] have published a number of cases.

If one believes, as does the writer, that these malignant tumors, carcinoma and others, grow not peripherically, but centrally, out of themselves, as it were,[4] then the mere fact of the lymph spaces and lymph vessels at the periphery of the growth being filled with endothelial cells

[1] Schottelius, Table I, No. 289.

[2] A. Fränkel, Über primären Endothelkrebs der Pleura, Berl. Klin. Woch., 1892, 21 and 22. In this connection it might be well to mention the case of Boström (Das Endothelcarcinom, Diss. Erlangen, 1876). It concerns a female twenty-eight years of age who had complained of no lung symptoms whatever, but who suffered mainly from the stomach, and the diagnosis of ulcer of the stomach was made. She died suddenly from profuse gastric hæmorrhage. At autopsy the ulcer of the stomach was found and carefully examined, by as high an authority as Zenker, and no trace of anything that could be taken for carcinoma was detected. Nevertheless, besides about half a litre of bloody serum in both pleural cavities without any adhesions of the lungs, there was extensive carcinomatous lymphangitis on the pleura of both sides and carcinomatous infiltration of the bronchial, tracheal, and retroperitoneal glands. Cases of carcinoma of the stomach with extensive carcinomatous lymphangitis covering the lungs have been frequently reported (Hilliarie, l'Union méd., 1874, Nos. 53, 54, and 55; Fräntzel, Charité-Annalen, 1878, III, 306; Debove, Gas. Hebd., 1879, N. 43, p. 688). But in these cases there was usually a conspicuous primary carcinomatous nodule to be found in the stomach. In this case of Boström's we have a practically certain assurance that there was no carcinoma in the stomach. By means of very careful examination, the bronchial mucous glands, the bronchial and alveolar surface epithelium could be positively excluded, and the author, after most painstaking study, by means of serial sections of both pleura, comes to the conclusion that the pleural affection has nothing whatever to do with the gastric ulcer, but is an independent carcinoma of the endothelium of the pleural lymph vessels.

[3] Wack, Ein seltener Fall von primärem Endotheliom der Lunge, Diss. Würzburg, 1898; Klemm, Über ein primäres Endotheliom der Lunge, Diss. München, 1905; Boström, Endothelcarcinom der Lunge, Diss. Erlangen, 1876; Cahen, Diss. Würzburg, 1896; Neelsen, Deut. Arch. Klin. Med., Vol. 31, p. 375.

[4] Borrman (Die Entstehung und das Wachstum des Hautcarcinoms, Z. f. Krebsforsch., II, 1904) is an enthusiastic adherent of uni-central or possibly multi-central growth of carcinoma. He calls attention justly to the fact that nobody has ever yet seen the conversion of a normal epithelial cell into a cancerous epithelial cell, and as his material consisted of carcinoma of the skin in its very earliest stages of development, his findings possess considerable weight.

means nothing as to histogenesis, while on the other hand it will never be possible to study a tumor at a stage early enough to show a possible development of the endothelium into malignant cells. Thus the diagnosis of primary endothelioma of the lungs is at present not possible, and it is preferable to call these tumors, not endothelioma, or sarcoma, on purely theoretical grounds, but carcinoma, if they are built and act like one, and sarcoma under similar conditions.

There are many microscopic pictures which are adduced as characteristic of endothelioma, especially those showing ramifications simulating a network of deep interlacing meshes, strongly suggesting a system of lymphatics, more or less completely filled with flat, endothelial-like cells. Plate 15, taken from the same tumor as Plate 9, shows this ramification. Neither Plate 9 nor Plate 15 can possibly be taken for an endothelioma, as other parts of the same tumor show typical carcinoma. In the same way Plate 16 shows very prettily the injection of the lymph vessels and lymph spaces with carcinomatous material, but it is from the same tumor from which Plate 7 is taken, in which was shown the mechanical injection of cells from a large typical carcinomatous alveolus into a lymph vessel, and it is not possible to prove, with any kind of magnification, that lymph endothelium was converted into carcinomatous cells.

CHAPTER VII

PATHOLOGY (Continued)

THE aphorism of Bard,[1] "Omnis cellula e cellula ejusdem generis," has been mentioned. If each kind of epithelium be considered a specific genus, then, according to him, cylindrical epithelium should produce only cylindrical epithelium; cuboid, or flat, or horny, should always and under all conditions produce a similar kind of epithelium. It soon became evident, however, that histology did not completely bear out the theory of the strict and limited production of cells of a certain character and structure from cells of identically the same character and structure. A long, and at this writing still unsettled, discussion has taken place concerning these questions, which are summarized under the title of "Metaplasia." It is necessary to touch briefly on some of the problems of metaplasia in order to obtain a proper notion of certain changes in structure and character of the cells that occur here and there, perhaps not infrequently, in lung tumors.

Virchow, as is well known, assigned a very great role to metaplasia in pathology, which meant for him something entirely different from what is understood to-day by the term. He attributed, especially to the connective tissue cells, all sorts of possible metaplastic changes, deriving osseous tissue therefrom as well as the epithelial cells of carcinoma. It is useless to enumerate the multitude of pathologists who have devoted time and no slight labor to this question of metaplasia. Opinions differ as to whether such a process actually exists, and, if it does exist, what the meaning of the process is. Ribbert defines metaplasia as a sort of regression, the cells losing their specificity and attaining a simpler structure, or in other words

[1] Loc. cit.

returning to some lower state of differentiation through which, in the regular course of development, they had already passed, and this without regaining new properties. Hansemann speaks of histological accommodation and of anaplasia as being a lower grade of differentiation along embryological lines, to which the metaplastic cells return. It is a mooted point whether this metaplasia of the cells proceeds under the laws of strict embryonal development and is ruled by the theory of the three germinal layers. If this hypothesis were true, then the metaplastic alterations to which, say, an entodermal epithelial cell is subjected would result only in such types of cell as normally originated from the entoderm.

On the other hand, it is maintained that metaplasia is entirely independent of embryonal influences and that the alterations in the character of the cell are produced by mechanical and physical conditions and in a great measure by causes as yet unknown. Finally, there is a theory entertained by many that the so-called metaplasia of cells and tissues, especially when occurring in tumors, is the outcome of congenitally displaced germinal remnants.[1] It is not necessary to go into further details on this point. For further reference to these questions in regard to tumors see Lubarsch.[2] Most important, and throwing light also on the metaplasia in tumors, is the work of Schridde.[3] Speaking only for lung tumors, and indifferent to what may take place in other tumors or organs with reference to metaplasia, it is to be noted that only such cells can justly be considered as metaplastic cells that reproduce not only the superficial character of the cells, such as localization, general appearance, etc., but the cell must exhibit the intimate and characteristic structure of the type of cells which is supposed to be represented. Thus, an ordinary flat epithelium can by no

[1] Ernst, Table I, No. 82.

[2] Lubarsch, Die Metaplasiefrage und ihre Bedeutung für die Geschwulstlehre, Arbeiten aus der path. Anatom. Abteilung des Kgl. Hyg. Institut in Posen, 1901, N. 305 ff.

[3] Schridde, Die Entwicklungsgeschichte des menschlichen Speiseröhrenepithels und ihre Bedeutung für die Metaplasielehre, 1907; Die Ortsfremden Epithelgewebe des Menschen, Jena, 1909.

means be considered as an epidermal cell unless it shows the peculiar structure, the fibres, and protoplasmatic bridges of the latter. A high cuboid or a laterally compressed flat cell is not converted into a cylindrical cell unless it shows at least some of the typical characteristics of the latter, — the nucleus at the base, the colloid, mucoid, or other secretion, etc. It is reasonable to assume, and seems to be the result of common experience, that the nearer the epithelia are related to each other, the more readily they will interchange in form and structure.[1] The transformations of one sort of epithelium into another, usually of cylindrical or cuboid epithelium into squamous epithelium, as has been frequently found in many kinds of inflammatory processes, in granulations, in pneumonias,[2] in the gall bladder,[3] in the urinary bladder, in the uterus, in the pancreas,[4] and other organs, are well known. They are usually the results of acute or chronic inflammations. It would indeed be strange if similar metaplasia of the epithelium were not also found in the bronchi and in the lungs. Under purely physiological conditions and under perfectly normal development, certain epithelial changes in the bronchi are regularly found. The largest and larger bronchial tubes are lined with ciliated cylindrical epithelium. In the smaller orders of the bronchial tubes these cylindrical cells lose their cilia. In still smaller orders the cells become cuboid, and finally, and without break in the continuity, the very smallest bronchioles and the pulmonary alveoles are lined with flat epithelial cells. Metaplastic changes in the epithelium under pathological conditions are shown by the work of Kitamura,[5] who finds in almost every grade of catarrhal

[1] Let it be understood that even in the question of metaplasia, the specificity of cells as postulated by Bard is still maintained to a certain extent. Metaplasia can take place only among cells embryologically closely related.

[2] Conf. the work of Friedländer, Über Epithelwucherung und Krebs, Strassburg, 1877, 57 S. mit 2 Tafeln.

[3] Dietz, Virch., Arch., Vol. 164, p. 381.

[4] Lewisohn, Zwei Seltene Carcinomfälle zugleich ein Beitrag zur Metaplasiefrage, Z'tschrift f. Krebsforsch., III, 1905, p. 528.

[5] Kitamura, Uber secundäre Veränderungen der Bronchien und einige Bemerkungen über die Frage der Metaplasie., Virch. Arch. 190, 1907, p. 160.

inflammations of the severer types, and especially in tuberculosis, the transformation of single layers of cylindrical ciliated cells into cuboid or polygonal cells. He does not consider this a true metaplasia, but simply a change in form, a "histological accommodation" in the sense of Hansemann.[1] On the other hand he finds genuine stratified epidermal epithelium with typical keratohyalin in the uppermost strata. This occurs in the large bronchi that are in open communication with tubercular cavities. Later, islets of this epidermal epithelium are found. There are many other metaplasias throughout the bronchial system, such as chalky degenerations and the formation of bone in the bronchial wall, etc. These metaplasias seem to occur very frequently as phenomena secondary to tuberculosis. In this connection, too, there is the work of McKenzie.[2] His conclusion, after very careful study of four cases in very young children, — the oldest only two years old, — is that real genuine metaplasia exists. Not only chronic inflammatory processes, as Simmonds believes, but also acute inflammations in the lungs may lead to metaplasia. The existence of such islets of pavement epithelium in the lungs after acute inflammation may have some connection with the development of pavement celled cancer in the lungs. The assumption of dislocated germinal cells is not needed to explain the development of pavement epithelium cancer in the lungs.

Eichholz,[3] in his very excellent experimental researches concerning the conversion of the epidermis into mucous membrane, and conversely, is inclined to think that metaplasia is not to be excluded with certainty, but on the whole it does not seem likely to him. In most of the cases where true epidermis was formed it could be demonstrated that it was due to a proliferation of the epidermis from without.

[1] Loc. cit.

[2] Ivy McKenzie, Epithelmetaplasie bei Bronchopneumonie, Virch. Arch. 190, p. 351. (NOTE, by the author. — We know of many cases of conversion of cylindrical into pavement epithelium; we know of none as yet of pavement into cylindrical epithelium.)

[3] Eichholz, Experimentelle Untersuchungen über Epithelmetaplasie, Langenbecks Arch. f. klin. Chir., Vol. 65, p. 959.

Cylindrical epithelium, according to him, is able to produce epidermis. If, however, epidermis occurs in tissue of cylindrical epithelium, it is to be explained either through the proliferation of the epidermal epithelium from without or by the assumption of a dislocated embryonal germ.

It is, therefore, not difficult to explain the occurrence of true cancroid, to use the old name, — that is to say, of nodules consisting of typical epidermal cells with the characteristic structure and the formation of cancer pearls. It appears natural, too, according to the views of Kitamura, that these cases generally occur in connection with tuberculosis, as in the cases of Friedländer,[1] Perrone,[2] Gougerot,[3] and a number of others. The tumor either came from without and penetrated through the wall, and thus projected into the tubercular cavity,[4] or developed directly from the wall of the cavity. In the case of Ernst[5] the cancroid took its origin from the wall of the main bronchus of the right upper lobe. As from this location no epidermal tissue could normally be expected, Ernst attributed his tumor to development from a germinal remnant. In view of this widespread instability in the types and forms of the epithelial cells and the apparent lawlessness with which these transformations from cylindrical to cuboid and from flat to cylindrical, from ciliated to non-ciliated, recur, one is tempted to share with John Marshall[6] the belief in a complete anarchy as the essence of cancerous proliferation. This anarchy Marshall is inclined to attribute to the lack of nerve influence, no nerves having as yet been demonstrated in any malignant tumor, with the exception of a very few perivascular nerve fibrils. According to this view there would be no meaning in metaplasia and no reversion to embryonal types or conditions. The process would simply be anarchy, which might be subdivided into anarchimorphic, anarchibolic,

[1] Friedländer, Table I, No. 87.
[2] Perrone, Table I, No. 257.
[3] Gougerot, Table I, No. 98.
[4] Perrone.
[5] Ernst, Table I, No.82.
[6] Marshall, The Morton Lecture on Cancer and Cancerous Disease, Lancet, II, 1889, pp. 1045 ff.

anarchisynthetic forms. Beneke[1] does not agree with this view. According to him the nervous system can only *regulate* the forces contained in the cell, and he suggests a disturbed equilibrium in the relations and proportions of the cell function as a causal factor. In the writer's opinion all these facts and theories lead necessarily to the conviction that epithelium is a highly plastic material, designed to accommodate itself in manifold ways to the demands which local, physiological, and pathological conditions require. The changes thus produced, however, can only take place among the specific epithelial cells, whether derived from entoderm, ectoderm, or mesoderm. The divisions into squamous, epidermal, cylindrical, ciliated, and epithelial depend upon more or less functional and often unstable qualities and are employed more for the sake of convenience than as a description of the character of the cells. The numerous studies with reference to the question of metaplasia[2] do not appear to give much enlightenment as to tumors, but seem to corroborate the opinion here upheld. The theory of persisting and abnormally dispersed germinal centres and remnants, while it cannot be disproven, is not necessary for the explanation of the so-called metaplastic transformations.[3]

[1] Beneke, Neuere Arbeiten zur Lehre vom Carcinom, Schmidts Jahrbücher, 1892, pp. 73 ff.

[2] Kawamura, Beiträge zur Frage der Epithelmetaplasie, Virch. Arch., Vol. 203, No. 3, 1911.

[3] Fütterer, Über Epithelmetaplasie, Lubarsch-Ostertag, Ergebnisse, IX, 2, p. 706. Simmonds, Münch. Med. Woch., 1898, p. 189. Watsuji, Zeitschr. f. Krebsforschung, Vol. 1, No. 5, 1904.

CHAPTER VIII

CLINICAL

UNTIL very recently it was the common consensus of medical opinion that the diagnosis of primary carcinoma or sarcoma of the lung, if it could be made at all, was one of a more or less high degree of probability, but never of certainty and precision. Within the last few years, however, decided advances have been made in our diagnostic methods, rendering it possible to diagnosticate a tumor of the lung with nearly as much certainty as the present status of our diagnostics permits a cancer diagnosis for any other internal organ of the body. Stokes's remark, speaking of the diagnosis of primary cancer of the lung, that "though none of the physical signs of this disease are, separately considered, peculiar to it, yet the *combinations and modes of succession* are not seen in any other affection of the lung,"[1] has been true for nearly a hundred years and has been a source of stimulation and hope to many. The clinician's ambition to-day is not, at the conclusion of long and anxious observation, to make a diagnosis of lung tumor that is merely probable. His object should be to diagnosticate the tumor at the earliest possible stage of its development, and with such accuracy as is needed for the basis of surgical treatment. This, however, is by no means an easy task.

NOTE. — It will be necessary to refer frequently to the writings of Stokes (Table III, No. 78), Hughes (Table I, No. 121), Graves (Table III, No. 30), Fränkel (Table I, No. 85), Pässler (Table I, No. 241), Leopold (Table I, No. 174), and Lenhartz (Table II, No. 46), and to that most recent and excellent publication of Wolff (Die Lehre von der Krebskrankheit, Vol. II, Jena, 1911). In making this general statement of indebtedness, the writer hopes to be excused from special references to these authors where such reference is deemed unnecessary.

[1] Diseases of the Chest, New Sydenham Society, London, 1882, pp. 420 and 421.

In many cases the diagnosis is impossible because there are no symptoms pointing to the lungs and the tumor is an unexpected discovery on the autopsy table. To illustrate this, some cases may be singled out, — that reported by Colomiatti[1] and that of Bernouilli.[2] The latter was a case of a female fifty-one years of age, without clinical history except that she died of peritonitis after operation for umbilical hernia. Autopsy was held the day after. A small round celled sarcoma of the size of a walnut was lodged in the right upper lobe and evidently had not caused any symptoms. There were no metastases, not even of a single gland.

In some cases there are symptoms, but none pointing toward disease of the lungs, and therefore the observer is misled. The patient of Beveridge,[3] it is true, had a slight cough and some pressure over the chest, but not sufficient to interfere with his work. He worked until death, which came suddenly from hæmorrhage of the lungs. Klüber[4] reports an apparently healthy woman, dying suddenly from a burn, without any lung symptoms. In the case reported by Walshe,[5] there was no cough, nothing pointing to the lungs, but the symptoms were exclusively psychic. Davy's patient[6] was healthy until he acquired jaundice and pain in abdomen; physical examination of lungs was negative, no symptoms pointing to lungs, no cough, no pain. Degen[7] reports a patient healthy and strong; sudden death from hæmorrhage of lungs; no other clinical symptoms. The much cited case of McAldowie[8] is that of a child five and a half months old, — no dyspnœa, no cough, percussion clear over both lungs.

It is obvious that tumors such as the malignant neoplasms of the lungs, varying so widely in type and localization, entering into so many unstable relations with other organs of the chest and, through metastases, with almost every

[1] Table II, No. 14.
[2] Über primäre Lungensarkomatose, Diss. München, 1907.
[3] Table I, No. 38.
[4] Table I, No. 145.
[5] Table I, No. 329.
[6] Table I, No. 56.
[7] Table I, No. 59.
[8] Table III, No. 53.

organ in the body, cannot be expected to present a permanent and characteristic set of symptoms. One is reminded of Graves,[1] who, reporting a case of malignant disease of the lungs, probably sarcoma, gives a minute analysis of the clinical symptoms and shows how both he and Stokes were misled. He candidly confesses that he should have made the proper diagnosis during life, but adds, in his characteristic manner, "I became quite tired of the difficulty of attempting to explain the phenomena observed and gave up all further attempts at diagnosis." It may be said in a general way that the possibility of a clean-cut diagnosis depends largely upon the anatomical localization of the tumor and upon the degree of development which the disease has reached when the patient is presented. It is not probable that the actual beginning of the blastomic development will ever be perceived, since it is necessary that the tumor attain a certain size before it can be recognized. Again, in the last stages, the clinical picture may be so complicated, nearly every organ of the body participating in the morbid process and causing symptoms which almost completely mask the pulmonary lesions, that the difficulties are greatly augmented and a diagnosis rendered practically impossible.

There are, however, certain symptoms which are common to all malignant neoplasms and some which are more or less peculiar to malignant neoplasms of the lungs, to which brief attention must be given.

I. Pain. This is frequently not a real, acute pain, but rather a sense of discomfort and pressure in the chest. According to Schmidt[2] the pulmonary parenchyma is probably insensible to pain, therefore the acute or chronic genuine stabbing pain is brought about when the pleura participates in the inflammatory processes which are apt to accompany the progress of the disease. Taking into account the well-known relations between the two folds of the pleura and the nerves, — the brachial plexus, intercostal nerves, phrenic nerve, — and the diaphragm, it is clear that

[1] Table III, No. 30.

[2] Die Schmerzphenomene bei inneren Krankheiten, etc., Wien, 1906.

the pain produced in one place may be referred to localities quite distant from the point of origin. The pain in the shoulder and around the clavicle, the neuralgias of the arm, the intercostal pains along the chest and in the abdomen and diaphragm, which so often occur both in carcinoma and in sarcoma, are thus easily explained, and it is understood that where there is no pain the pleura has evidently not been involved. Schmidt also points out that a large area of dulness, without spontaneous or pressure pain, excludes any inflammatory process of either fold of the pleura and suggests the possibility of a neoplasm. Figures representing an approximate estimate of the occurrence of pain in malignant lung tumors can be obtained from Tables I and II. In Table I pain is not mentioned in 206 cases out of 374. This, of course, does not mean that pain was not present, but merely that any reference to pain was omitted. The probability therefore is that the cases in which pain was a feature are much more numerous than would appear from the Table. In eighteen cases it is distinctly stated that there was no pain during the entire course of the disease, while pain is mentioned as present in one hundred and fifty cases. In Table II, dealing with sarcoma, pain is given as a symptom at some time during the disease in fifty-two cases, in two cases only is it distinctly stated that there was no pain whatever, in six cases there is no clinical history, and pain is not mentioned in the history of thirty-four cases.

The possible irradiations along various nerve tracts are illustrated by the case of Demange,[1] in which the pain was constantly referred to the healthy side. In two cases the pain was mostly abdominal, while in the case of Harris[2] the pain was referred to both sides of the chest. If one could draw deductions from these figures, it would seem that sarcoma causes more pain than carcinoma. This result, however, is probably illusory and caused by the imperfect statistics.

II. Cough. This complication is one that would naturally be expected in any malady of the lungs, and therefore

[1] Table II, No. 17. [2] Table II, No. 33.

in tumors of the lung. Indeed, cough is probably the most common of all symptoms appertaining to lung tumors, and there are but few cases in which it is not a factor. A rather insignificant, but fairly constant, irritating cough, mostly without expectoration, may be the earliest symptom of tumor. Where this cough exists and nothing abnormal is found in the chest, the upper air-passages, œsophagus, etc., the possibility of the presence of a lung tumor should, in the writer's opinion, suggest itself. A case observed by the writer, which does not appear among the material collected, may serve to illustrate this rather important point. It concerned a lady of some sixty-odd years, fairly healthy, and so far as known, without any hereditary strain of malignancy. She began to cough this same short, hacking cough, without pain, without expectoration. Both lungs on close examination gave no indication of anything abnormal and nothing abnormal could be detected anywhere, except a trifling pharyngitis. Very gradually some loss of flesh and strength became apparent, and after several months a very small area of dulness at the right hilus, together with some fairly loud cornage, could be made out. The dulness gradually extended. For some time previous a tumor had been suspected, principally from the cornage, and the diagnosis was corroborated when the dulness and cornage were also found at the apex. There was never much expectoration, and no blood. The emaciation and weakness increased, the area of dulness on the right lung extended over the entire lower and middle lobes, with diminished voice and breathing, secondary plainly palpable nodules appeared, especially in the liver, accompanied by jaundice, and death from exhaustion took place in about a year from the beginning of the cough. No autopsy could be obtained, but there is little room for doubt that this was a genuine case of carcinoma of the lung.

Besides this slight hacking cough, accompanied by little or no distress, all varieties of cough, up to the most violent, explosive, and harassing forms, are reported. The cough may, as just mentioned, be an early symptom of the disease;

on the other hand there may be no cough until shortly before the fatal end. As bronchitis is one of the ordinary features of the case, the fairly loose cough, accompanied by large and small mucoid rales, is present in the majority of cases. If bronchiectatic cavities, or cavities of other origin, are present, there will probably be attacks of coughing of an explosive character, discharging large quantities of muco-purulent or purely purulent expectoration, often mixed with blood. When the cavities are sufficiently refilled or communication with the bronchus is again restored, these spells are apt to recur. The distressing, rasping, but usually dry cough that is caused by compression or irritation of the larger bronchi and the trachea is often noted. At times this cough is accompanied by considerable stridor. Schwalbe[1] claims that carcinoma produces very little stridor, if any at all, but that it occurs in its greatest intensity and most frequently in sarcoma, and his explanation of this is that sarcoma gives rise to earlier and more extensive involvement of the mediastinal organs than carcinoma, thereby exerting more pressure on the trachea and nerves. This does not, perhaps, quite correspond with the actual facts, and it can be seen from the material collected here that carcinoma also can, and frequently does, involve all the mediastinal organs. There is, furthermore, the hoarseness, also the well-known laryngeal cough, both of which usually occur in late stages of the disease, when either one or both superior laryngeal recurrent nerves have become involved and paralyzed. In Table I cough in its various forms is mentioned in 174 cases, while in 191 cases it is not mentioned. In nine cases it is distinctly stated that there was no cough. In Table II cough is mentioned as a symptom forty-six times; five cases had no cough, and thirty-nine passed without any mention of it.

III. Sputum. Much more important than the cough,—in fact, one of the principal signs to be depended upon for the diagnosis of malignant lung tumors,—is the character of the sputum. This, however, can only be satisfactory as the result of close study. It is necessary to bear in mind that

[1] Deut. Med. Woch., 1891, No. 45.

a single examination of the sputum will rarely give reliable results. The ordinary routine examination of the expectoration, such as is the common practice, which consists in a search for tubercle bacilli or elastic fibres, and at best a few cells, is entirely insufficient when so delicate a diagnosis as that of primary lung tumor is the object. It is necessary to examine the sputa systematically and thoroughly, both morphologically and bacteriologically, and under certain conditions even chemically, as frequently as possible, until the diagnosis is assured. In Table I there are 143 instances out of 374 in which no mention is made of the sputum. It is, therefore, not ascertainable whether in these cases there was any expectoration or what its character may have been if present. In thirty-six cases it is clearly stated that there was no expectoration. Stokes[1] was the first to speak of a peculiarly homogeneous and tenacious sputum, the color of which he compared to black currant jelly and which is spoken of by others as resembling raspberry jelly or prune juice. The latter designation is particularly used in American textbooks. Stokes considered this sputum as pathognomonic of lung tumor, especially of carcinoma, and many textbooks still spread this belief. It has been shown, however, that this peculiar sputum is *per se* not pathognomonic for malignant tumors of the lung. It occurs in other diseases, and even in primary carcinoma of the lungs it is not constant and is recorded in but few cases. Looking over Table I, it is found that the currant, raspberry, and prune juice sputa have been placed on record in only six out of the 374 cases. This may not absolutely coincide with the actual facts, but it is reasonable to suppose that where there is a clinical history given, so characteristic a symptom would be mentioned. In Table II only two cases are recorded out of a total of ninety. But though this kind of sputum cannot be considered pathognomonic, it should, in the writer's opinion, if associated with other symptoms that all point toward tumor of the lung, be considered corroborative of the diagnosis. The processes ultimately

[1] Loc. cit.

at work in the production of this peculiar type of sputum are entirely unknown up to date. It seems certain that the peculiar color is not merely due to the presence of blood; there must be other conditions involved. Perhaps it is not unreasonable to suspect that some specific kind of hæmolysis, caused, it may be, by some toxic product of the tumor, formed only under certain conditions (perhaps oleic acid — conf. Faust[1]) is responsible. The subject has been insufficiently studied and is well worth further research.

Bloody expectoration is associated with most cases of lung tumors at some period of their development. The sputum, either mucoid or mucopurulent, as the case may be, may be intimately mixed with the blood, or the latter may appear in the form of hæmoptysis, varying in profuseness. It has been claimed[2] that hæmoptysis is uncommon in lung tumors. According to the writer's own experience and his study of the literature of the subject, which is to a great measure collected in the Tables, this statement cannot be verified. It seems, on the contrary, that hæmoptysis is of rather *frequent* occurrence. A number of cases are reported in which the very first symptom was a profuse hæmoptysis, others where hæmoptysis occurred frequently in the course of the sickness, and in quite a number of cases, several of them under the writer's own observation, death was caused by very profuse hæmorrhage. The mere bloody sputum, too, may appear as one of the very first symptoms, though it sometimes requires all the skill of a trained cross-examiner to elicit the fact that there has at one time been some slight bloody expectoration. On the other hand, blood may appear at a later stage, or even at the very last stage, and sometimes, again, be constantly present throughout the course of the disease. The records in Table I show about one hundred cases in which the sputum was bloody, not counting the currant, raspberry, and prune juice sputa mentioned before, and not counting

[1] Über chronische Ölsäurevergiftung, Archiv. f. exp. Path. und Phar. Festschrift f. Schmiedeberg, p. 171.

[2] West, Table I, No. 326. Also Hampeln, Über den Auswurf bei Lungencarcinom, Z'tschrift f. klin. Med., Vol. 32, 1897, p. 246.

sixteen cases of profuse hæmoptysis. In sixty-five of these one hundred cases pure blood seems to have been expectorated, representing, as it were, small hæmoptyses. The others were various kinds of sputa, — mucoid, mucopurulent, purely purulent, etc., — all of them mixed more or less with blood. In three cases tubercle bacilli were found in the bloody expectoration. In thirteen cases the sputa were entirely free from blood. In forty-five cases the expectoration was ordinarily without blood, and characteristic merely of the condition of the bronchi and the lungs, without reference to tumor. Greenish expectoration is mentioned twice, and one case is reported of olive-green sputum.[1] Just what kind of sputa these are cannot be ascertained, as there was no detailed examination recorded. They are probably not characteristic. In Table II sputum is not mentioned in thirty-one cases, in eight cases no expectoration took place, in ten others there was not even a cough, while twenty-five were bloody, three with profuse hæmoptyses. In twelve cases hæmoptysis is the main characteristic of the sputum. Green sputum is noted five times, and it is believed that Bell[2] was the first to mention it as occurring in sarcoma. There are no means of judging of its character or its relation to sarcoma. In Janssen's case[3] the sputum was not merely green, but *grass*-green, and he believes this to be characteristic of sarcoma of the lung. Traube[4] finds grass-green sputa associated with pneumonia or bronchitis, accompanied by jaundice, — the so-called "bilious pneumonia," — and also in chronic pneumonia without icterus. He claims that the varying colors of these sputa are due to the red blood cells and the hæmatin going through the same cycle of discolorations as an ordinary hæmorrhage into the skin, the last being green and representing, according to Traube, the last stages of oxidation of the hæmatin. He does not mention tumor.

That grass-green sputum cannot be characteristic of sar-

[1] Elliott, Table III, No. 24.
[2] Table II, No. 3.
[3] Table II, No. 39.
[4] Gesammelte Beiträge f. Path. u. Phys., Vol. II, 1871, p. 699.

coma of the lungs may be deduced from the fact that it does not appear in the majority of cases, while sputum, mentioned as merely green, is seen in carcinoma, as well as in other diseases of the lungs and bronchi. Moreover, grass-green sputum is said to occur rather frequently in cases of chronic pneumonia and of pulmonary abscess. Here, also, further study is imperative, not only to determine the diagnostic value, but also the conditions under which such peculiar sputa are produced. Perhaps there is some special conjunction of circumstances in cases of sarcoma of the lung which, while not occurring very frequently, produces when present this peculiarly characteristic sputum. The writer feels that in a case of suspected sarcoma of the lungs the grass-green sputum of Janssen would be strong corroborative evidence.

It seems at first glance almost self-evident that sputa from a malignant growth of lungs and bronchi must necessarily contain tumor elements, and that thus the diagnosis of such tumors could easily be made certain beyond doubt. Some reflection will show, however, that this is not so simple as it seems, and must in fact be a rather rare occurrence. There are first to be considered the quantities of various kinds of epithelial cells that can normally be present in the mouth and air-passages; the cylindrical cells, ciliated and without cilia, that come from the bronchi, the nose, etc., the possible admixture of cells from the œsophagus, etc., all of which would prevent the direct recognition of tumor cells. It is, therefore, always hazardous to suspect lung tumor merely from the presence of scattered epithelial or round cells. On the other hand, if the cells in question occur in unusually large quantities and more or less constantly, or if cells which normally are not found in the expectoration are constantly present, the suspicion of tumor is permissible, provided the clinical symptoms correspond. The tumor elements are not apt to be expectorated unless there is open communication with a bronchus and the tumor itself has softened and is in a state of incipient disintegration. Tumor cells, also, that are expectorated under such circumstances are as a rule in such a state of degeneration that their character as

derivatives of a neoplasm can only be recognized if some remnants of their blastomic structure and organization remain. This, of course, would make the diagnosis absolutely certain, especially as secondary lung tumors seldom cause marked symptoms, and never such as are peculiar to primary growths. Some cases in point are on record. It has even happened that a portion of necrosed lung tissue has been expectorated before any other symptoms of pulmonary disease were apparent, as in the case of Claisse.[1] In the case of Ehrich,[2] villous and bloody masses containing cancerous material were expectorated. Pearson[3] records a case in which pieces of necrosed lung tissue were coughed up, accompanied by tubercle bacilli, and the tumor was diagnosticated by him as "encephaloid." A similar case was that of Turnbull and Worthington,[4] in which a lump the size of a walnut, of alveolar structure and containing cylindrical and cuboidal cells, was expectorated. Still another, was the case recorded by Peacock,[5] in which masses were expectorated consisting of spindle and round cells. There are a number of other cases which can be found by reference to the Tables, most of which are doubtful, however, because they lack the all-important microscopic examination. Most of the cases in which the expectoration is recorded of larger or smaller portions of tumor, which are degenerated but nevertheless distinctly recognizable as either carcinoma or sarcoma, belong as a rule to late stages, and while they clinch the diagnosis they do so at a time when all hope of beneficial therapeutic interference is practically gone. It is quite natural therefore that anxious search is made for elements whose appearance in the sputum, while characteristic of lung tumors, is not delayed until the later stages of development. Hampeln[6] found certain cells in the expectoration from cases of carcinoma of the lungs which, according to him, if only

[1] Table I, No. 52. In the discussion of this case, Troisier reports a case of primary cancer of the lung in which the diagnosis was confirmed by tumor particles in the sputum. Menetrier also reports similar cases.

[2] Table I, No. 78.

[3] Table I, No. 249.

[4] Table I, No. 321.

[5] Table III, No. 59.

[6] Loc. cit.

seen but a single time, assure the diagnosis of carcinoma. He says, "Polymorphic, polygonal cells that are *entirely free from pigmentation* are seen in the sputum where there is carcinoma of the lungs, *and in no other case* but carcinoma. In all other cases, if there are epithelial cells at all in the sputa, they are principally round or oval cells, pavement or ciliated cells, *highly pigmented.*" These cells do not seem to have gained favor in the eyes of diagnosticians. The writer is not aware that Hampeln's views have been corroborated by others, and he himself has never seen the cells in question. He must confess, however, that his examinations with reference to them have not been sufficient to warrant a definite conclusion. Lenhartz[1] finds large spherical cells filled with a multitude of fatty granules and associated with abundance of epithelial cells that are strangely deformed and possess club-like or tail-like projections. He is of opinion that these fatty or granular cells are pathognomonic of pulmonary carcinoma. Tuberculosis may be present without changing anything in the character and diagnostic value of these cells. In Table I the granular fatty cells are found in the sputum seven times. The writer is inclined to agree with Lenhartz that these cells are strictly pathognomonic, at least of carcinoma of the lung, there being as yet insufficient experience as to sarcoma. Since the writer's attention was drawn to these cells he has found them in every case of primary carcinoma that has come under his observation (about twelve cases), and a very long and close study of sputa from all manner of other lung diseases tends to show that they occur in carcinoma alone. The technique of examination is very simple, inasmuch as no staining is required, and a spread of sputum, not too thin, perhaps in a little glycerine and water, or perhaps without any addition, if examined carefully with a moderate magnification, will not fail to show these "Körnchenzellen" if they are present. The cells can sometimes be obtained, also, by puncture of the pleura or the tumor.[2] It is to be remembered that the

[1] Münch. Med. Woch., 1898, No. 1, p. 28.
[2] Müser, Table I, No. 209.

conditions under which these cells are formed are still unknown. Lenhartz believes that they are produced by fatty degeneration of the large epithelial cells of the tumor. This, however, is merely hypothesis. Their appearance in the sputum, — for what reason is not known, — is, moreover, very inconstant and irregular. It may be necessary to hunt for them for days in succession before they are found; it may be, on the other hand, that the first examination will show them. They may occur in great profusion, or again only scattered singly here and there through the smear. But it is the writer's conviction that when found they are pathognomonic of pulmonary carcinoma, and furthermore that a daily, systematic examination of the sputum is necessary and that one should not be discouraged if the cells are not found at once.

IV. That respiratory difficulties constitute one of the most frequent symptoms in lung tumors is obvious. An insignificant shortness of breath on slight exertion is frequently reported as the first symptom. This may be present long before percussion and auscultation give evidence of any lesion in the lungs. The difficulty in breathing is often so slight that only a rigid inquiry will elicit the fact of its existence. Its gradual increase may be the first thing to alarm the patient and cause him to submit to a medical examination. Beginning with this slightest form of dyspnœa, all transitions up to the severest orthopnœa occur. Among the material here collected, numerous examples will be found of death from suffocation. No physician who has ever seen the intolerable and hopeless suffering of those unfortunates who are doomed to the awful death by suffocation accompanied by intensest orthopnœa extending over weeks, sometimes even months, will ever forget it. Fortunately, it is not always continuous, but is apt to come in spells. Nevertheless, it is one of the most cruel tortures to which man can be subjected and before which the physician has stood powerless. Not only is he unable to cure, but even to relieve, as morphine loses its virtue and surgery is helpless. Complete closure of a bronchus does not cause

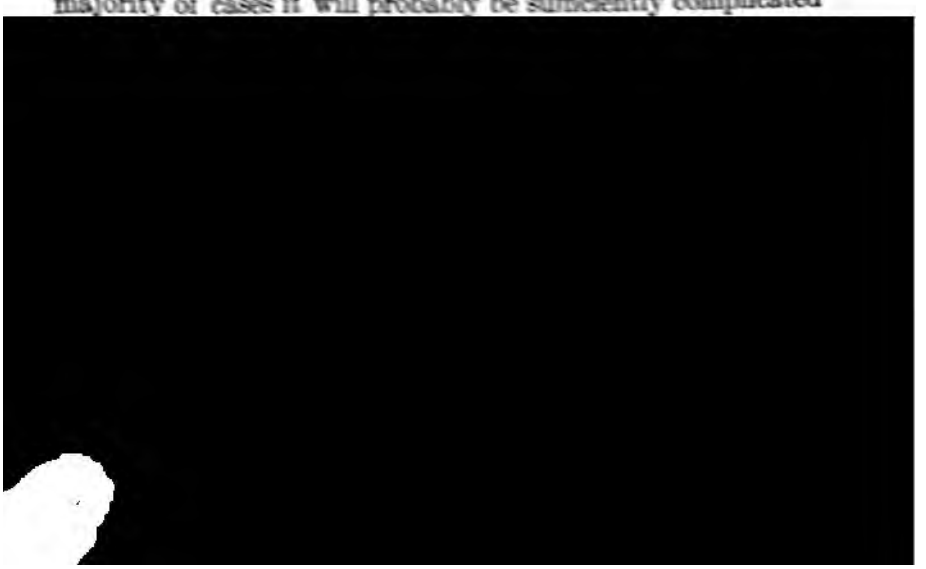
these worst forms of suffocation, but at most only a very moderate degree of dyspnœa following exertion. The intensest forms are brought about mainly by compression or obstruction of the trachea. The tumor may grow up from below through a main bronchus into the trachea and thus obstruct it, or, as is perhaps more frequently the case, involvement of the mediastinal glands may form large masses pressing upon the trachea from without so as to produce almost entire closure. Though a most frequent symptom, dyspnœa does not necessarily complicate lung tumors. In Table I there is a record of twenty cases in which no dyspnœa of any kind was found throughout the disease. There are 189 cases where dyspnœa is not mentioned. In 165 instances dyspnœa was present, and this number includes all the different forms of respiratory disturbance, from the slightest incipient dyspnœa to the most terrific orthopnœa. In Table II appear two cases in which it is recorded that no dyspnœa was present, fifty-two cases in which dyspnœa is recorded as present at some stage of the disease, leaving thirty-six cases in which no mention is made of this symptom.

V. Cachexia, the usual companion of malignancy, is also a very frequent accompaniment of lung tumors. Its incidence, however, is extremely irregular. There are cases on record, as the Tables show, in which loss of flesh and weight are apparently among the earliest symptoms, certainly before anything abnormal could be detected on the lungs.[1] In other cases there is no apparent loss in flesh and weight throughout the course of the disease. In one of the writer's own cases,[2] though there were profuse hæmorrhages and the disease lasted about four years, the man kept stout and florid and apparently without any loss of strength until his death, which was caused by suffocation from a profuse and sudden hæmorrhage. A positive gain in weight during the progress of the disease has been observed by v. Fetzer[3]

[1] Rottman, Table I, No. 277.
[2] Table I, No. 3.
[3] Bronchuscarcinom, Correspondenzblatt Würtemberg ärtzlicher Landesverein, Feb. 25, 1905.

and also by Rothmann.[1] Le Sourd[2] reports a distinct tendency to obesity throughout the disease. Notwithstanding all that, a great number of cases are recorded in which death ensued from exhaustion.

VI. There is still considerable diversity of opinion as to *fever* in carcinoma and sarcoma of the lungs. Kast[3] and Ebstein and others recognize a somewhat typical intermittent, but usually not very high, fever in the course of the growth of sarcoma. Darolles[4] is of opinion that there is no fever in uncomplicated cases of carcinoma of the lungs. On the other hand Hampeln[5] finds an intermittent fever similar to the malarial type in cases of occult visceral carcinoma. The same is maintained by Kast[6] and a number of others, who also find fever of an intermittent character, especially in cases of cancer of the stomach. Without going into the details of this subject for carcinoma in general, but considering only the carcinomata of the lungs, it appears, looking over the list of cases, that such as seem to be uncomplicated have, as a rule, no rise of temperature of any significance. That fever in an absolutely uncomplicated case of cancer of the lungs is possible, cannot be denied, in view of the modern researches on auto-intoxications and metabolic disturbances caused by the carcinoma itself. In the case of cancer of the lungs, however, it is hardly possible to determine whether the tumor is uncomplicated or not, and in the overwhelming majority of cases it will probably be sufficiently complicated



Japha[1] reports a distinct bradycardia in one of his cases, but no cause for it is mentioned. So far as one can see from the clinical and post-mortem notes, it does not seem to have any connection with the lung tumor.

VIII. THE BLOOD COUNT has not thus far been of much assistance in the diagnosis of lung tumors. There are but a few cases in which the blood count is reported, — in all less than a dozen, — and even these lose greatly in value inasmuch as it does not appear from the records how the hæmoglobin was estimated and how often and under what varying conditions the blood count was done. One almost involuntarily gets the impression that the blood count was done only once, while it is obvious that it should be repeated at stated intervals. Here also is a fruitful field for further investigation.

Of the few blood counts that are on record, it may be well to mention, first, that of Kappis.[2] He finds cancer cells with mitosis in the sputum. The blood he reports as follows: Hb., 120; red cells, 6,200,000; white cells, 50,560–40,700; eosinophiles, 33–39½–12%; polynuclears, 56.9%. The pleuritic effusion was a sanguinolent serum which contained *no* eosinophiles. In this case the blood count appears to have been taken repeatedly, but is thus far inexplicable in that there is nothing in the history as given by the author to explain the enormous leucocytosis, the accompanying polycythæmia, and the very high percentage of eosinophiles, the polynuclears, at the same time, being rather low. The autopsy also throws no light upon this curious condition. The author remarks in his description of the microscopical structure that enormous heaps of eosinophiles were found in places free from tumor. It is best in this case to indulge in no hypotheses as to the possible cause of this blood picture and its contradictions.

Another imperfect blood count is given by Naun[3]: Hb., 40; leucocytes, 15,000. It is to be regretted that the number of erythrocytes is not stated, because without knowing the number of red cells one is left in doubt whether this is a

[1] Table I, No. 136. [2] Table I, No. 139. [3] Table I, No. 224.

mere hæmoglobin anæmia with a moderate leucocytosis, or whether the red cells also are diminished. A complete blood count, including differential, and repeated several times during the course of the disease, should in the future be considered an essential requirement. In a similar way Musser[1] records merely increased leucocytosis, without further details, in both his cases. In two of the writer's own cases,[2] where the advantages of hospital observation could be had, the blood count was taken repeatedly with the average, in Case No. 2, of: Hb., 65; red cells, 4,500,000; leucocytes, 15,000. This corresponds very nearly with the blood count given by Cohen and Kirkbride[3]: Hb., 60; red cells, 4,400,000; leucocytes, 18,000; differential count of leucocytes not stated. In Case No. 4 the blood count was as follows: Hb., 62; red cells, 3,980,000; leucocytes, 14,300; differential fairly normal. In this case, besides the hæmoglobin anæmia, there is a distinct reduction in the number of red cells, but no deformation or other alterations in them.

The case of Ebstein[4] is very similar to this latter case: Hb., 62; red cells, 3,492,000; but the leucocytes are unusually high, there being 32,000 (differential not stated). It is impossible at present, there being so few blood counts available, to come to any definite conclusion. The leucocytosis is easily accounted for by the inflammatory and often purulent processes going on in the lungs. Whether there is a real disproportion between the number of red cells and the percentage of hæmoglobin, thus pointing perhaps to some hæmolytic process, or whether in the majority of cases there is only the usual anæmia, both of red cells and of hæmoglobin, to be expected in any case of increasing malignancy, —especially if there is considerable loss of blood,—is a problem that awaits further study. In the case of Cohen and Kirkbride the disproportion between 4,400,000 red cells and only sixty hæmoglobin is very striking. The blood counts given by Faust[5] show some resemblance to the

[1] Table I, Nos. 222 and 223.
[2] Table I, Nos. 2 and 4.
[3] Table II, No. 13.
[4] Table I, No. 76.
[5] Loc. cit.

blood counts mentioned here, inasmuch as his rabbits showed a continuous decrease in the hæmoglobin with a comparative increase in the red cells and a tendency to some leucocytosis. The interesting coincidence is certainly worthy of note.

Müller[1] has among his cases no case of lung tumor. As a result of his careful blood counts nothing characteristic is shown. The hæmoglobin has a tendency to go down steadily, as also the number of red cells, and there is a tendency to leucocytosis and to an increase of the polynuclear cells, but nothing characteristic of the blood in lung tumors is shown.

IX. Incidentally, there should be mentioned two cases in which *diabetes* was a complication of the disease, as in the cases of Kratz[2] and Lübbe.[3] There is no evidence, so far as can be seen, that the diabetes stands in any relation to the lung tumor.

X. THE CLUBBED FINGERS which are sometimes reported have, it is obvious, no specific relation to malignant growths. They are not different from the clubbed fingers that we see in other chronic diseases, especially of the lungs, and more particularly where pus is present.

[1] Oswald Müller, Über den Blutbefund bei Krebskranken, Diss. Berlin, 1909.

[2] Table I, No. 151.

[3] Table I, No. 187.

CHAPTER IX

CLINICAL (Continued)

WHEN one is compelled to face the almost infinite variety of pathological lesions and complications that are associated with most of the primary malignant neoplasms of the lungs, the clinical pictures and their symptomatology appear to present an almost hopeless confusion. A larger experience and comparative study will show that there is, after all, a certain monotony of essential symptoms, around which the varying complications and lesions are grouped. It is possible in this way to arrange the entire clinical material at our disposal into certain groups which, with their subdivisions, supply a fairly well-classified arrangement of the clinical phenomena. A certain number of tumors, as has been shown above, are apt to withdraw themselves from diagnosis by causing no symptoms whatsoever, and others in which a diagnosis is not likely because symptoms caused by metastatic deposits[1] completely dominate the clinical picture and successfully mask the pulmonary disease. For the great majority of tumors which do produce symptoms, the remark of Stokes, that "the facility of diagnosis mainly depends on the anatomical disposition of the disease," is still true.

According to Pässler,[2] the clinical pictures accompanying pulmonary malignant neoplasms can be aptly arranged in two main groups. The first group contains

[1] There is much difference of opinion among authors as to the frequency of metastases in malignant tumors of the lung, some claiming that secondary deposits are very rare in carcinoma and correspondingly numerous in sarcoma, others expressing directly opposite opinions. By consulting Appendices C and D the reader will obtain a fair idea of the occurrence of metastases in the various organs both in carcinoma and in sarcoma and he will find very little difference between carcinoma and sarcoma in this respect.

[2] Loc. cit.

the cases in which the symptoms referable to diseases of the lungs and bronchi largely predominate. These tumors, mostly carcinoma, nearly always take their origin from the bronchial ramifications from the second order downwards to the smaller and smallest bronchioles, and as a rule do not directly implicate the hilus. The second group embraces to a large extent the tumors of the root of the lung. This group may be accompanied by intense and agonizing symptoms on the part of the respiratory organs: lungs, bronchi, etc.; but these are usually of a secondary nature, though they may dominate the clinical picture. The typical symptoms of this variety of lung tumor are largely mechanical and composed mainly of such symptoms as result from pressure on or compression of the thoracic organs, especially of the mediastinum, and from the overcrowding of the intrathoracic spaces. The elementary symptoms mentioned above are common to both groups.

The classification of Marfan,[1] identical in principle with that of Pässler, is perhaps a little more convenient, and is adopted here. It reads as follows:

I. The acute or galloping form of pleuro-pulmonic cancer.
II. Chronic pleuro-pulmonic cancer.
    1. Broncho-pulmonary type, being the classical type of carcinoma of the lungs.
    2. Type suggesting tumor of the mediastinum.
    3. Pleuritic type.
        (*a*) Pleuritic type of the pleuro-pulmonary tumor without effusion.

The first main division, the *acute or galloping miliary carcinoma of the lungs*, runs an extremely rapid course, accompanied by cough, dyspnœa, and asphyxia; death usually in a month or thereabouts. The clinical picture in many respects resembles that of acute miliary tuberculosis, and at autopsy both lungs and pleura are found studded with miliary nodules which, however, on microscopic examination, are found to be cancerous. This form is extremely rare and only a very few scattered cases have been reported. The case of Elisberg[2] may possibly come under this heading. In

[1] Quoted from Chauvain, loc. cit.

[2] Table I, No. 80.

this case the primary tumor was in the bronchus. It is generally denied that this form of carcinosis ever occurs as a primary pulmonary lesion. This statement, however, cannot be supported by absolute proof. Granted that it does occur as a primary lesion, it seems that at present there are no means of obtaining a correct diagnosis during life.

II. THE CHRONIC PLEURO-PULMONARY CANCER. This is the ordinary chronic form of cancer of the lung, in which the lungs, bronchi, and pleura are mainly affected by the tumor. The subdivisions which have been mentioned are, it is necessary to insist, merely for the convenience of the clinician and do not represent strictly defined and firmly established independent syndromes. With the progressive development and extension of the blastomic lesion, accompanied by a varying degree of destruction of the lung and the secondary effects of the tumor on its environment, the symptoms must necessarily vary, and the so-called subordinate groups may merge one into the other. It may often be observed that several or all of the various types here mentioned are exemplified in the course of a single case.

1. *Pulmonary cancer.* The classical type of cancer of the lung. This represents the ordinary bronchial carcinoma which, as shown above, is by far the most frequent form of the disease. The dominant symptoms are referable mainly to the lungs and bronchi. The earlier stages usually suggest merely a chronic bronchitis.

It is commonly said that in the very earliest stages of the development of the tumor, percussion will fail to show any appreciable difference from the normal. This may, in the main, be true. It is, however, the writer's deep conviction that, even in very early stages, percussion may be found significantly altered, if a sufficiently delicate technique be adopted.

It cannot fall within the scope of this study to enter in detail into a discussion as to the relative values of the various methods of percussion or into the manifold theories that have been put forward in this most important chap-

ter of diagnostics. But it is the writer's opinion that the ordinary loud, resounding, finger to finger or hammer to finger or plessimetre percussion cannot be made to give proper results in these earlier stages. The writer has employed for years the "Schwellenwerthperkussion" and orthopercussion as elaborated by Goldscheider, Plesch, and Curschmann, in combination with the auscultatory percussion according to Ewald and the friction method of Bianchi. The results, checked by the orthodiascope, have as a rule been most satisfactory. These methods, if carried out with the delicacy of touch and hearing which they require, may be expected to lead to the detection of comparatively slight pathologic lesions where other methods of percussion will fail. It is understood that percussion must vary according to the different stages of development and the various complications that may occur in the course of malignant disease of the lungs.

There are cases on record, as for instance that of Rottman,[1] where it is reported that physical signs on the lungs were negative, although a large tumor was found. This is only one of many similar examples reported. In early stages a dull percussion note is found at one apex or the other, or, which is much more difficult to find, at the hilus posteriorly. The anterior aspect of the upper chest is more frequently the seat of dulness than the posterior, but the dulness at the hilus, of course, can only be heard near the spine. This dulness may gradually increase from a slight change in the percussion note to absolute flatness. The flatness and boardlike resistance to the percussing finger are very often due, not to the tumor itself, but to the atelectasis caused by the tumor. Woillez[2] designated as characteristic of lung tumor what he called the "tympanisme thoracique," which consists of a tympanitic, immediately preceding the full, percussion note. This has not turned out to be a pathognomonic sign and is wellnigh forgotten.

[1] Table I, No. 277.
[2] Dictionn. de Diagnost. méd., Paris, 1870, 2d Ed.

Characteristic of these earlier stages is, further, the fact that with dull or flat percussion, auscultation shows diminished respiration. Where pleuritic effusion or pleuritic adhesions and thickenings can be excluded, which is comparatively easy for the upper anterior portions of the chest, this sign of increasing dulness with diminishing voice and breathing sounds is extremely suggestive, and while not absolutely pathognomonic of tumor, should make the presence of tumor highly probable. The mechanism of the sign, — increasing dulness with diminishing voice and breathing without pleuritic effusion, — is of course given in the more or less complete obstruction of a bronchus, by which means those portions of the lung not affected by tumor are in a more or less complete state of atelectasis. Most interesting in this connection is the case reported by Körner.[1] In this case there was flattening of the right chest, absolute flatness of percussion, and entire absence of respiratory and vocal sounds, — in a word uncomplicated and complete obstruction of the right main bronchus, a diagnosis that was confirmed by autopsy. The area of dull percussion note in these cases is usually sharply defined, as distinguished from tuberculosis and pneumonic conditions, where the delimitation is more diffused, the abnormal percussion merging gradually into the normal. The configuration of the area of dulness or flatness is, however, usually quite irregular, according to the topographical disposition of the tumor, its depth, its extension, and its surrounding reactive processes.

As the tumor grows and degenerations of various kinds make their appearance, as breaking-down and irregular excavations in the tumor come about, — and it has been stated above that this happens much more frequently than most authors concede, — the percussion note and auscultatory signs must necessarily change in character and become variable to a considerable extent. Tympanitic percussion note, amphoric breathing, metallic rales will show the presence of a cavity, and when a case has reached this stage

[1] Table I, No. 147.

one is apt to pardon the clinician who does not hesitate to diagnosticate tuberculosis. Besides more or less profuse hæmorrhages, it is not unusual to find at this stage irregular fever of considerable intensity and night sweats. The fever may resemble the hectic type. Notice is to be taken, also, of the bronchiectatic dilatations which occur so often and to so great an extent, as a consequence of obstructed bronchi. Here percussion as well as auscultation offers frequently interesting changes. If the bronchus is completely closed for a long time, the bronchiectatic cavity naturally fills with secretion, — pus, mucus, blood, and so on, — possibly continually dilating, and the percussion note over this will be dulness to flatness, and auscultation will hear neither voice nor breathing. Suddenly, as it were, the bronchus is reopened by ulceration and degeneration of the obstructing tumor, there is a free discharge of the bronchiectatic contents, and in the place where formerly there was absolute flatness, we have now the tympanitic note and the auscultatory symptoms pointing to a cavity.

It is obvious that these signs can only occur in very late stages of the disease. The process may be varied in different ways and it may be taken as characteristic of these later ulcerative stages when such sudden changes in auscultation and percussion appear. As a good illustration of these conditions may be mentioned the case of Arnal.[1] In this case there was total absence of breathing, but normal percussion over the entire right lower lobe. There were all the other symptoms of a malignant growth in the lungs. Very suddenly, and only a few days before death, the respiratory murmur was again distinctly heard over the right lower lobe, — in other words, the tumor, partly compressing, partly proliferating into the right main bronchus of the lower lobe and completely filling it and preventing the passage of air, had ulcerated away to a great extent and thus again permitted communication with the air. It has frequently been said that percussion over a neoplasm of the lung offers a greater resistance to the finger

[1] Table I, No. 13.

than is normal. This sign, however, depends on so many varying factors, as the closeness of the tumor to the chest wall, the condition of the lung, etc., that it is not constant and not characteristic, though when present a welcome corroboration.

Another sign of great diagnostic value is the auscultatory symptom, to which Behier[1] gave the name of "cornage." This is a sound very similar to that obtained from the trachea when partially compressed. It is pathognomonic of bronchial obstruction and might be considered, especially when heard about the root of the lungs, and better still when accompanied by some dulness, as an almost certain sign of tumor. It must be remembered, however (and for that reason the word "almost" is inserted), that certain other conditions which may result in bronchial obstruction must be excluded. This should not be difficult, for probably all the processes which may result in bronchial obstruction, and thus in an audible cornage, are acute. Thus it is not unusual to find the sign in acute, severe bronchitis or in an influenza pneumonia, or even in chronic bronchitis when a bronchus happens to be obstructed by masses of viscous and tenacious mucus. But in all these cases the obstruction is temporary and disappears as a rule in twenty-four hours. But in tumor the cornage is practically constant and will remain so until the bronchus is *completely* obstructed, or will disappear after a comparatively long time when the bronchus, through ulceration, becomes again freely permeable to air. Cornage may be a very early symptom.

2. *The mediastinal type of lung tumor.* A bronchial cancer, — and it is indifferent of what order the bronchus may be, whether large or small, — has two main preformed routes of extension at its disposal. The easiest and most natural, and the one that is in the majority of cases primarily resorted to, is along the bronchial ramifications and the peribronchial tissues into the interior of the lung. This holds good also for those sarcomata that originate in the minute peribronchial glands or in the peribronchial connec-

[1] Gaz. de Hop., April, 1867.

tive tissue. In the later stages the bronchial wall is apt to be broken down and penetrated by the tumor, and thus the bronchial and then the mediastinal lymph nodes become involved and are occasionally enormously enlarged. The mediastinal lymph nodes, possibly both anterior and posterior, now take part, the mediastinum is filled with tumor masses, the pericardium may be covered or even penetrated by the neoplasm, pericarditis develops, secondary growths in the heart appear, the large vessels, both aorta and cavæ, the pulmonary arteries and veins are surrounded and either compressed or penetrated by the tumor. It should be mentioned that the aorta, while often much compressed, so far as the writer's knowledge goes, never takes part in the tumor proliferation and is never penetrated by it. As a consequence of all this crowding of the mediastinal organs, the superficial veins of the chest are dilated, sometimes to a huge extent, and œdœma, varying from œdœma of a single arm, or the face, to a general œdœma of the entire body, arises. One or the other, sometimes both, of the laryngeal recurrent nerves are involved, the trachea, large bronchi, œsophagus, are compressed, obstructed, and even penetrated by the tumor. The participation of the œsophagus causes the dysphagia so frequently reported. And thus all the symptoms of an intrathoracic growth, or more especially of primary mediastinal tumor, are evolved. Sarcoma, originating at the hilus of either lung, differs from this group of symptoms in so far as the direction of the growth is less towards the lung and tends to advance more rapidly and at an earlier stage of the disease toward the mediastinum. It is this mediastinal type of tumor that usually causes the dreadful attacks of asphyxia and orthopnœa mentioned above.

3. *The pleuritic type.* In cases belonging to this type, the symptoms referable to the pleura predominate. So far as tumors of the lungs and bronchi are concerned, this form corresponds to a rather late stage of the disease. In primary malignant disease of the pleura, however, which is beyond the scope of this monograph, this form usually marks

the beginning of the lesion. The symptoms in the main are those of acute, sub-acute, or chronic pleurisy. There is stabbing pain in the chest, radiating to the shoulders or in other directions, and all the signs of a persistent pleuritic effusion, which too often tend to mask more or less completely the symptoms of pulmonary disease. We have the absolute flatness on percussion, the total absence of voice and breathing on auscultation, very often the obliteration of the intercostal spaces, frequently the bulging of these same spaces.

In nearly every case of lung tumor, the pleura participates to a certain extent in the morbid process, sometimes with sometimes without effusion; according to Herrmann[1] in fifty per cent of the cases. In this pleuritic type, however, effusion more or less profuse is always present and is likely to recur after tapping of the chest, so that these tappings must be repeated again and again, at longer or shorter intervals. In ordinary pleurisy the aspiration of the effusion affords prompt relief of the harassing symptoms. Even in the pleurisy associated with extensive tuberculosis, this relief can be recognized. It is characteristic of the type of tumor under discussion here, — though it applies also to primary carcinoma of the pleura, — that relief after removal of the pleuritic effusion either does not follow at all, or lasts but a very short time. As a rule there is no abatement of the cough, dyspnœa, expectoration, and general distress, but there may be intense pain caused by the wrenching of the diseased tissues. Some exceptions to this fairly general rule are on record, such as the case of Unverricht,[2] where, after one or two aspirations of sanguinolent fluid, all symptoms seemed to disappear, the patient felt entirely well and gained in weight, until secondary tumors made their appearance in the skin where the aspirating needle had penetrated. Hampeln[3] also reports a case

[1] Deut. Archiv. f. klin. Med., Vol. 63, 1899, p. 583.

[2] Beiträge zur klin. Geschichte der krebsigen Pleuraergüsse, Z'tschrift f. klin. Med., Vol. IV, 1882, pp. 79 ff.

[3] Table I, No. 101.

in which the pleuritic effusion was absorbed without tapping and without recurrence. These cases, however, are rare exceptions.

The fluid recovered by the first few tappings may be clear yellow serum, but sooner or later it is certain to become bloody. It is well known that bloody pleural effusion occurs in other diseases, especially in tuberculosis, and is in itself, therefore, not pathognomonic of malignant tumor of the lungs or pleura. It is said, however, that the change from initial clear serum to bloody effusion is characteristic of neoplasms of the lung. It is uncertain whether this is correct or not. It is reported, on the other hand, very often that a thick, chocolate-like fluid is recovered in the later tappings. This, according to the writer's opinion, is certainly pathognomonic for malignant disease in the pleural cavities. Adipose and chylous effusions into the pleura are reported, but are found very rarely in malignant neoplasm of the lung,—certainly much less frequently than in the disease of the peritoneum. The same holds good for empyema. In the case of Walch[1] it was evidently a pneumococcic affection and had no direct relation with the carcinoma. Nothing characteristic has as yet been found by the bacteriological examination of the pleuritic effusions.

The results of the cytological examinations have been a subject of much discussion, with no positive conclusions. Ehrlich[2] has called attention to the diagnostic importance of the presence of organically connected cell-groups in the effusion. Fränkel has called attention to large vacuolized cells, sometimes attaining gigantic dimensions. These are probably tumor elements and this is assured if they are found to contain glycogen, but they probably belong to primary diseases of the pleura. It is therefore not very difficult to diagnose the presence of malignant tumor in the chest from the study of the cells in the effusion, if such can be found. It is, however, almost impossible, under the condi-

[1] Cancer du poumon gauche, pleurésie purulente pneumocoques, Soc. anat. de Paris, 1893, VII, Sér. 5.

[2] P. Ehrlich, Charité-Annalen, 1880, Jahrg. VII, p. 226.

tions given, to distinguish an endothelial from an epithelial cell, and therefore a primary endothelioma of the pleura from a carcinoma of the lungs, and it is wise not to depend for diagnosis on the cytology of the pleural exudate alone. This rule should hold, even though exceptions are possible, as in the case of Hellendall,[1] who found in the bloody effusion in the chest white particles consisting of heaps of round cells, sufficiently characteristic to warrant the diagnosis of sarcoma of the lung, — a diagnosis which was confirmed by autopsy. Krönig,[2] on making a probatory puncture, penetrated the tumor with the needle and found attached thereto white particles which microscopic examination showed to be lympho-sarcoma, and he was thus enabled to obtain an absolutely certain diagnosis during life. He devised a method based on this, by which in every doubtful case the attempt was to be made to remove particles of tumor by aspiration. There are serious objections to this method. It is not only very uncertain in its results, as the needle does not always return with tumor particles, but usually only with a little blood, but there is actual danger of causing a hæmorrhage.

It may be taken as a trustworthy sign of malignancy if a paralysis of the recurrent laryngeal is observed on the side of the pleuritic effusion. It has been stated above that as a rule there is no relief after removing the effusion in cancerous pleuritic effusions. It may also be said that, after removal of the fluid, the various phenomena of percussion and auscultation, which until then had been masked, will appear in unmistakable distinctness, and thus greatly assist in the diagnosis. The dislocated heart which, on removal of the pleuritic effusion, will make no attempt to return to its normal place, — other symptoms being favorable, — suggests tumor. The retraction of the affected side of the thorax, accompanied by increased dulness and impaired or entirely abolished respiratory motions, when caused by a thickening of the pleura, sometimes to an enormous degree, is not at all characteristic of

[1] Table II, No. 35.

[2] Table II, No. 42.

malignant growth in the lungs after the stage of effusion is over, but is well known to occur in other forms of pleurisy, especially in tuberculosis.

(*a*) *The pleuritic type without effusion.* This is most typical and applies almost exclusively to those large massive sarcomata or lympho-sarcomata that are apt to fill the greater part of the chest. It marks, of course, a late stage of the disease. There are all the signs of a pleuritic effusion, often increased circumference of the side of the chest involved, displacement of the heart, etc. There may also be present, but not necessarily so, the ordinary general symptoms of malignant growth of the lung, — the cough, dyspnœa, fever, sweats, hæmoptysis, cachexia, etc. The exploring needle fails to discover any fluid. On the contrary it seems to penetrate into a more or less solid mass extending to such depths as to preclude any possibility of its being merely an abnormally thickened pleura. Particles of tumor may be brought away by the needle. It is characteristic of this type that, while there is complete absence of respiratory murmur or vocal fremitus, there is a very loud propagation of the heart sounds, so that if the tumor occupies, for instance, the right chest, the heart sounds can be heard very distinctly over the whole of the right chest, both in front and in back.[1] This sign alone is sufficient to assure the diagnosis of a solid intrathoracic mass. Consequently in most of these cases there is dilatation of the superficial veins of the chest and possibly of those of the abdomen, more or less intense dyspnœa, paralysis of one or both recurrent laryngeal nerves, direct or indirect affection of the heart itself, the large vessels, etc.

A few words should be said concerning some morbid processes which are found in the train of pulmonary tumors. Pneumonias, both acute and chronic, are among the most frequent accompaniments of lung tumors. In a number of cases the pneumonia is recorded as the first symptom. The patients state that they were taken acutely ill with chill, high fever, cough, rusty sputum, from which they recovered,

[1] Withauer, Table I, No. 342. Budd, Table III, No. 13.

but that from then on they were never quite well. These acute pneumonias may be pneumococcic pneumonias or produced by other well-known bacteria. The chronic form, if not of the cheesy tubercular character, is principally of the indurative type. These pneumonias may lead to symptoms which mask the signs of the tumor, or at least are most perplexing. Sometimes, though rarely, they are followed by a genuine empyema. Atelectasis[1] has been mentioned above and is the natural consequence of the blocking by tumor of larger or smaller bronchi, resulting in the collapse of the entire territory which the bronchus supplies with air, as well as its splenification, if no change occurs in the bronchus. There will be moderate dulness on percussion, though sometimes, — particularly if the area is small, — the percussion note will remain fairly normal. But vocal fremitus and breathing sounds are completely abolished. It is on account of these secondary processes that the extent of the dull area does not coincide with the actual size of the tumor. The tumor, as the X-rays have shown,[2] may be larger than the dull percussion would lead one to expect. On the other hand these secondary processes give a dull percussion note of their own, which, merging into that caused by the tumor, is apt to give an exaggerated idea of the tumor's size.

Another complication which requires mention, though already hinted at above, is gangrene. It is easily conceivable, in fact it is almost self-evident, that a proliferating tumor in the lung, rapidly destroying lung tissue and penetrating into blood vessels, can at any time envelop and, by compression, obstruct an artery of some size, or, by breaking through the arterial wall, close an artery completely, and by either of these means cause total ischæmia, followed by gangrene. According to the size of the artery involved, the gangrenous territory will be larger or smaller, occasionally occupying the greater part of a lobe. When a case is first seen in this condition, the diagnosis is intensely difficult, — wellnigh impossible, — as even those signs in the

[1] Körner, loc. cit.

[2] Leo, loc. cit.

sputum which we have found to be pathognomonic are apt to be lacking. Under these conditions, too, the X-rays will not give any useful information, and it is only by most careful study of the history and the progress of the disease that a probable diagnosis can be arrived at. On the other hand, if the gangrene appears, after previous examination and observation of the patient have settled the diagnosis of tumor, or at least have caused tumor to be suspected, the gangrene will rank only as a complication. It may be casually added that there may be interesting involvements of the sympathetic which will in no wise interfere with the cardinal symptoms and the diagnosis, but which are of interest as again demonstrating the manifold complications that are constantly arising.[1]

It was not very long ago that A. Fränkel [2] wrote that the X-rays were of little service in the diagnosis of lung tumors. Since then the X-rays have become a most remarkable and efficient aid to diagnosis in general, and there exists the well-founded hope of their increasing efficiency as further improvements in the apparatus and advances in technique are made. They have also proved, as is well known, a powerful therapeutic agent in many diseases, but not as yet for treatment of lung tumors. The hope may reasonably be entertained that with the systematic and proper application of the X-rays to the exploration of the chest, the diagnosis of lung tumor may be assured when no other means will give equally certain results. Leo[3] diagnosticated an osteosarcoma of the lungs, secondary to a sarcoma of the right knee, during life, with certainty and much topographical detail by means of the X-rays, which also showed a much greater extent of the tumor than could be ascertained by percussion and auscultation. It may also be possible, perhaps, to obtain this diagnosis at a time when the tumor is as yet very small and causing but little subjective disturbance.

If this happy result is ever to be realized, it will be neces-

[1] Krönig, loc. cit. [2] Loc. cit.

[3] Nachweis eines Osteosarkoms der Lunge durch Röntgenstrahlen, Berl. Klin. Woch., Vol. XXXV, 1898, No. 16, p. 349.

sary to examine the chest with the Röntgen rays even where there are no symptoms pointing to any disease in the chest. It has been the writer's practice for a great many years, as an essential part of the routine examination in *every* case that presents itself at his office, no matter what the patient's complaint, to subject the chest to a thorough exploration with the Röntgen rays. We prefer the examination with the orthodiascope (de la Campe) and a very large (12″×16″) fluorescent screen. Thus one is enabled at a single glance to observe heart, lungs, in fact, taking advantage of various positions, nearly all the thoracic contents during action. It is particularly useful, also, for watching the respiratory mobility of the lungs and diaphragm. It has repeatedly been noted that in lung tumor the mobility of the lung is markedly diminished or entirely abolished. In cases of mediastinal tumor the respiratory mobility of the lung remains unchanged or is increased, and Jacobson [1] has found this valuable in distinguishing between the two types of tumor. With good light, good apparatus, and some experience, comparatively minute lesions in the lungs can be discovered. Any abnormality that is thus brought to notice can be permanently fixed for further reference by the photographic plate, approximately accurate measurements can be obtained, and thus the gradual enlargement of the tumor verified and its blastomic nature determined. The shadow of a carcinoma or sarcoma just starting from the hilus and gradually extending toward one of the pulmonary lobes is a very striking picture when seen with the Röntgen rays, and often suggests the tumor diagnosis when the observer, though other characteristic symptoms were present, would have been led astray. The interpretation is more difficult when the shadow extends over the upper lobe of either side, as this is the favorite localization of tuberculous processes. Sometimes the sharp linear delimitation at the base of the shadow makes for tumor rather than tuberculosis. It speaks for tumor, also, if the affection is confined to one

[1] rimäre Lungen und Mediastinal Tumoren, Festschr. f. Lazarus, Berlin,

upper lobe, for as these pictures are seen only after the disease has progressed to a certain extent, the upper lobes of both lungs, if the process were tuberculous, would probably have been affected. The shadow remaining unilateral speaks for tumor. The absence of tubercle bacilli in the bloody sputum, with the increasing shadow on one lobe only, also suggests tumor. But where tuberculosis is associated with advancing carcinoma or sarcoma of the lung, the Röntgen rays are of little value, and if a differential diagnosis is possible, it must be attempted by other means. It is beyond the scope of this study to enter into further details concerning the X-rays. The reader is referred to the well-known books of Holzknecht,[1] Grödel,[2] Grunmach,[3] and Arnsperger.[4] The details, however, as to the value of the X-rays in malignant lung tumors may be studied by the reader in the cases recorded by Otten [5] and Müser,[6] from the Eppendorf Krankenhaus, Hamburg, under the direction of Lenhartz.

Another recent aid to diagnosis is the bronchoscope, that has been so successfully employed in various affections of the trachea and the larger bronchi. It has also done service in establishing beyond doubt the presence of a bronchial neoplasm.[7] Karrenstein[8] reports the case of a male forty-eight years of age, in which the tumor, taking origin from the large bronchus immediately below the first division of the right main bronchus, was made distinctly visible by the bronchoscope, the tumor having been suspected. H. von Schrötter[9] reports a case of a male forty-four years of age where the bronchoscope showed very plainly

[1] Mitteil. aus Laboratorium für radiologische Diagnostik und Therapie, Jena, 1907.

[2] Röntgendiagnostik in der inn. Med., Münch., 1909.

[3] Über die diagnostische und ther. Bedeutung der X-Strahlen f. d. inn. Med. u. Chir., Deut. Med. Woch., 1899, No. 37.

[4] Die Röntgenuntersuchung der Brustorgane, Leipzig, 1909.

[5] Table I, No. 228.

[6] Table I, No. 205.

[7] Killian, Zur diagnostischen Verwertung der oberen Bronchoskopie bei Lungencarcinom, Berl. Klin. Wochenschr., 1900, p. 437.

[8] Table I, No. 141.

[9] Table I, No. 325.

a prominent tumor in the right bronchus from which a piece was exsected for microscopic examination, which showed cancerous epithelia with glycogen reaction, and thereby settled the diagnosis.

It is always unwise to endeavor to prophesy as to future possibilities, at least within the domain of biology and pathology. It cannot be denied that the field of bronchoscopy may be greatly extended by improvements in apparatus and in technique. It is, however, the writer's opinion that its usefulness in the diagnostics of lung tumor, at this writing at least, is limited. It appears at present that from the nature of things, bronchoscopy can make visible only such tumors as have involved the upper bronchi. Of what occurs in the bronchi of lower orders and in the depths of the lung, the bronchoscope leaves us in utter ignorance. Moreover, there are undoubtedly many cases that come under observation, late in the course of the disease, where the dyspnœa, brain involvements, and other concomitant symptoms are of such gravity, and menace life to such a degree, that even the boldest would hesitate to introduce a bronchoscope, though there remained but little doubt that the instrument could make visible the involvement of the upper bronchi. In such cases the diagnosis should be made by other means, — especially as even the exact recognition of the tumor by the bronchoscope would be of little avail to the patient.

In concluding the clinical part of the subject, it is still necessary to mention a few points which may be helpful in differentiating lung tumors from other diseases closely resembling them in symptomatology, and for which they might easily be mistaken. First and foremost, of course, is the question — tuberculosis or tumor? This question can be easily answered at autopsy, but it is not quite so simple in the living person. Some points in the differential diagnosis have already been brought out. The small tumors, particularly cancroids, described as growing from the walls of a tuberculous cavity, will probably never be diagnosticated, unless pathognomonic cells in the sputum direct

attention to the possible existence of tumor in the respiratory system. At any rate it is always advisable to remember the exhortation of Gerhardt, — always to suspect tumor in persons of advanced age where tuberculosis is not likely and cannot be found by ordinary examination, and where there is cough with bloody expectoration. It is plain that the differential diagnosis as between tuberculosis and tumor cannot be made at once, but requires prolonged and most careful examination and observation. Even then it will often be impossible to decide absolutely. That it can be done, however, is shown, among others, by the following case of Fessen.[1] This concerned a man forty-five years old, who had pulmonary phthisis and a cavity in the right apex. Tubercle bacilli were found in the sputum. The tuberculosis gradually improved and showed signs of cicatrization. Opposed to this, however, was the cough with scant expectoration, the general cachexia and sharply defined complete flatness. The puncture was negative; the Röntgen rays showed a dense shadow, very sharply defined at its lower border. This alone sufficed to justify a diagnosis of tumor of the lung. This diagnosis was corroborated by the bulging of the intercostal spaces, the dilatation of the veins, the small radial pulse on the affected side of the chest, the œdœma, and all the symptoms of a bronchial obstruction completing the clinical picture. The autopsy showed a cicatrized tuberculosis of the left lung, and in the right apex a cavity, and the lower portion of the right upper lobe cancerous.[2] The sudden changes in percussion and auscultation, of which mention has been made, are not likely to occur in tuberculosis, but speak for tumor. The absence of bacilli in the sputum, it is hardly necessary to mention, may persist for a long time in tuberculosis, but in advanced cases, especially where extensive ulceration has taken place, tubercle bacilli are sure to make their appearance. The modern tests for tuberculosis, — the injection test, the Wolff-Eisner and von Pirquet tests, — will only be helpful if persistently negative, as only in that case do they

[1] Centralbl. f. innere Med., 1906, No. 1. [2] Wolff, loc. cit., p. 817.

help to exclude the presence of active tuberculosis. Further experience and improvement in methods may possibly result in greater facility and precision of this diagnosis. Enough has been said to show that no hard-and-fast rules can be given to diagnosticate lung tumor in a tuberculous individual. The hints as to differential diagnosis that have been given may serve in a general way as guides, but the physician must mainly depend upon his own insight and judgment in each individual case.

If a lung tumor happens to be first seen when it is far advanced, the suspicion of the presence of an aneurysm may arise. This is hardly to be expected in the ordinary case of carcinoma of the lungs, where the history, the train of symptoms as outlined, the cells in the sputum, etc., will speak against aneurysm, although as a matter of fact an aortic aneurysm is rarely to be absolutely excluded. The differentiation as between sarcoma and aneurysm is somewhat more difficult, as sarcoma naturally tends to grow more towards the mediastinum and away from the lungs than does carcinoma. In some cases the Röntgen rays may help, although as a rule they are useless. A tumor lying upon or adherent to the aorta will pulsate. The pulsation is generally of a lesser extent and more definitely circumscribed in aneurysm, while in the case of tumor it is of a more diffused character, involving sometimes the entire chest. The difference in the radial pulse, as mentioned above, a common sign in pulmonary tumor, will not aid in recognizing an aneurysm unless the smaller pulse is found on the side opposite to that to which all indications point as the seat of the tumor. A. Fränkel and others called attention to the fact that lung tumors usually cause a paralysis of both recurrent laryngeal nerves, while in the ordinary forms of aneurysm of the arch of the aorta it is only the left laryngeal recurrent that is affected. Only in exceedingly rare cases, in cases of enormous size of the aneurysm or of multiple aneurysms, has paralysis of both laryngeal nerves been observed.[1] As the case proceeds, secondary visible or pal-

[1] Bäumler, Deut. Archiv. f. klin. Med., Vol. II, p. 563.

pable tumors, the usual characteristics, etc., will assure the diagnosis of tumor, to the probable exclusion of aneurysm. The tendency for the spreading and enlargement of aneurysm is naturally more toward the left than toward the right side. This fact may occasionally be of some use in diagnosis.

Stokes and Graves mentioned a certain asymmetry of the thorax in cases of malignant neoplasm of the lung. A. Fränkel and others have in recent times called attention to this as an almost pathognomonic symptom. The asymmetry consists in the retraction of that side of the chest where the tumor is supposed to be localized, especially in its posterior and lateral aspects, after tapping of the pleuritic effusion. This "rétrécissement thoracique" is supposed to be caused by the rapid involvement of the pleura, with its consequent thickening, by which the proper expansion of the lung is prevented.

As a curiosity which does not occur very frequently, but which, when it does happen, can hardly be distinguished from primary malignant tumor of the lung, see the case of Boris.[1] In this case there were all the symptoms from which a diagnosis of primary malignant neoplasm of the lung could have been made, though the clinical diagnosis was tuberculosis. At autopsy no positive anatomical diagnosis was attainable and it was only through microscopic examination that the tumor was found to be chorionepithelioma, the primary focus being an insignificant and easily overlooked spot in the broad ligament. The case of Couvèlere[2] may also be mentioned as one of those congenital cystadenomatous structures which might occasionally be confounded with primary malignant tumor. A glance at some of the other cases recorded in Table IV will show a number of instances of congenital adenomatous, cystic, and some secondary, tumors of the lung which might be confounded with primary malignant neoplasms, and in many cases the differential diagnosis will be almost impossible. There are some of particular interest, as the case of Dionisi,[3] the case of

[1] Table IV, No. 1.

[2] Table IV, No. 5.

[3] Table IV, No. 7.

Lesieur et Rome.[1] In the latter there was a large massive cylindrical celled typical carcinoma in the lung, where only a careful autopsy showed the primary focus to be a very insignificant nodule in the rectum. The tumor in the lung had precisely the character of the rectal cancer and is further remarkable for the fact that it is the only secondary tumor of the lung on record which consists of one large massive growth. The case of Laseque[2] is also to be noted as a case of lympho-sarcoma, where the primary focus could not positively be determined, but may have been in the lung, and the case is remarkable for the very unusual generalization of the lympho-sarcoma simulating a primary tumor. The cases of dermoid tumor of the lung, — that of Sommers[3] and Sormani,[4] — though they may in many respects, for a time at least, be mistaken for primary malignant neoplasm of the lung, will soon appear in their true nature by the expectoration of hair and other dermoid components. Of great interest, also, is the case of Linser,[5] which might easily have been mistaken for a malignant tumor of the lung, but which on autopsy turned out to be a congenital cyst-adenoma of the lung with a profuse production of mucus. Boecker,[6] when presenting his interesting case of the production of mucus in a case of carcinoma of the lung, speaks also of the cases of Löhlein[7] and Helly.[8] He believes that Löhlein's case is a genuine case of carcinoma with profuse production of mucus. The character of Helly's case is not yet satisfactorily determined. There is also to be mentioned the case of Jores.[9] In this case a dermoid cyst of the left lung was connected with a malignant cysto-sarcoma. It is not necessary to go into the details

[1] Table IV, No. 13.
[2] Table IV, No. 12.
[3] Table IV, No. 17.
[4] Table IV, No. 18.
[5] Über einen Fall von congenitalem Lungen-Adenom, Virch. Archiv., No. 157, p. 281.
[6] Loc. cit.
[7] Table IV, No. 14.
[8] Table I, No. 122.
[9] Über die Verbindung einer Dermoidcyste mit malignem Cystosarcom der linken Lunge, Virch. Arch., No. 133, p. 66.

of the case. There seems no doubt that the sarcoma was developed secondary to the congenital dermoid cysts.

It is customary, in the study of any clinical subject, to conclude with a careful discussion of the treatment. The treatment of primary malignant growths of the lung has not required much discussion in the textbooks up to date, and if mentioned at all is finished off with one or two lines. The diagnosis of a cancer of the lung was the death-warrant of the patient. In former times, before medicine determined to become one of the natural sciences, the patients were treated, not for cure, but for relief, by all sorts of barbarous means. It is about one hundred years ago that Heyfelder,[1] disgusted with the treatment that these unfortunates were receiving under all sorts of diagnoses, — the blood-letting, the purging, the salivation, etc., — urged upon physicians the necessity of recognizing these cases as cancer and as hopeless, and begs them not to add the torture of medical treatment to the sufferings consequent upon the disease itself. "Optima hic est medicina, medicinam non facere." Present-day medicine treats these cases purely symptomatically with the sole object of relief, and the interest attaching to an accurate diagnosis is mainly theoretical and scientific. It is not to be wondered at that the physician takes little interest in types of diseases that offer not the slightest hope of therapeutic success. It cannot really, he thinks, if he thinks at all, make any difference to the patient if he is to die of a pulmonary phthisis or of a far advanced pulmonary cancer. It is not very many years ago that Benda[2] was justified in asserting that cancer of the lung occupied a unique position, inasmuch as it was the only cancer that was absolutely beyond the reach of the surgeon; but he went a step further and added that no matter what progress surgery might make, it could never hope to deal satisfactorily with lung cancer, as it would always remain impossible to make the diagnosis early enough for any reasonable expecta-

[1] Loc. cit.

[2] Zur Kenntniss des Pflasterzellenkrebses der Bronchien, Deut. Med. Wochenschr., 1904, p. 1454.

tion of a cure by surgical interference. This is a practical illustration of how unwise it is to attempt to set limits to the progress of science. Since Benda made this daring statement, matters have completely changed. The technique of thoracic surgery and especially of lung surgery, — thanks to the efforts of Brauer,[1] Friedrich,[2] and Garré and Quincke,[3] and in a more practical manner the efforts of Sauerbruch, Willy Meyer, Meltzer, and Lenhartz, — though evidently still in its beginning, has already developed to a marvellous degree. Lenhartz[4] succeeded in operating several cases of cancer of the lung, and in one case, to all appearances desperate and hopeless, by removing the affected lobe in its entirety, prolonged the patient's life for a year and a half, and with comparative comfort. There is every reason to hope that the technique of this new branch of surgery will be still further developed and that in the near future thoracotomy and operations on the lungs will be attended with no more risk than are peritoneal operations to-day. If this is so, a new and great responsibility is placed upon the shoulders of internal medicine. It will be necessary, not only to educate the opinion of the laity so as to induce them to submit to these operations with the same readiness with which they now submit to peritoneal operations, but it will also be the sacred duty of the physician to recognize these cases and to recognize them as early as possible. The physician must be imbued with the conviction that malignant pulmonary disease occurs much more frequently than is commonly believed and that he may meet it any day in his practice among the young, as well as among the old. As at present the conscientious physician examines every chest for possible tuberculosis, so in the future every chest will have to be examined for possible tumor. The writer would go still further. Where all the means of diagnosis outlined in this little study fail, where there is suspicion of tumor,

[1] Referat über Lungenchirurgie, Verhandl. der Gesellschaft Deut. Naturforscher und Ärtze, September, 1908.

[2] Die Chirurgie der Lungen, Archiv. f. klin. Chir., 1907, Vol. 82, p. 1147.

[3] Grundriss der Lungenchirurgie, Jena, 1903.

[4] Conf. the various publications of the Hamburger Staatskrankenhaus.

but no assurance is possible, there should be, — it is emphatically here stated, — as little hesitation in resorting to an exploratory thoracotomy as there is nowadays in submitting to an exploratory laparotomy. A very few cases have been treated in this way.[1] The writer himself has had occasion to advise exploratory thoracotomy in two cases, but neither the physicians nor the lay public are as yet educated up to the proper point of view, and both cases preferred to die of cancer without an attempt at cure or relief. But even in cases far advanced, where there is apparently no hope whatever and death seems imminent, a thoracotomy may, under certain conditions, be indicated. It is obvious that no one would think of operating on the very aged, with predominant brain symptoms, or in any case where the lung symptoms are more or less in the background; but a thoracotomy, with a possible resection of one or two or three ribs, by draining off continually recurring effusions, by the decompressing effect produced thereby, quite similar, in fact, to the operations now performed for brain tumor, may give relief and produce euthanasia, in the place of otherwise unspeakable torture.

In conclusion, the writer may be permitted to express the hope that malignant disease of the lungs, so disastrous in its results, may perhaps in the near future be summarily dealt with in its incipiency, or at least modified in its progress, so as in some measure to assist in diminishing the sufferings of humanity. The writer's ideal hopes will be fulfilled if this essay contributes in ever so small a degree to this result.

[1] Müser, Table I, No. 208; Benda, loc. cit., and a few others.

APPENDICES

A

Carcinoma — *Duration*

Not stated	226
No autopsy	1
Doubtful	1
"Several years"	1
5 years	2
4 years	2
3 years	1
2½ years	2
2 years	7
1½ years	6
1¼ years	3
1 year	16
11 months	1
10 months	7
9 months	9
8 months	4
7 months	9
6 months	15
5½ months	4
5 months	11
4½ months	1
4 months	4
3½ months	1
3 months	15
2½ months	2
2 months	10
"Several months"	1
1½ months	5
5 weeks	3
3 weeks	2
2 weeks	2
	374

B

Sarcoma — *Duration*

Not stated	48
6 years	1
3½ years	1
3 years	2
Between 2 and 3 years	1
2¼ years	1
2 years	2
22 months	1
16 months	1
15 months	1
1 year	4
11 months	1
10 months	2
9 months	2
8 months	1
6 months	2
5 months	4
4 months	4
3½ months	1
3 months	3
2½ months	1
2 months	3
1½ months	2
1 month	1
	90

C

Carcinoma

METASTASES

Lymph Nodes

Bronchial lymph nodes	117
Mediastinal lymph nodes	45
Tracheal lymph nodes	26
Cervical lymph nodes	23
Retroperitoneal lymph nodes	23
Hilus nodes	16
Regionary lymph nodes	15
Axillary glands	15
Mesenteric glands	14
Supraclavicular	13
Peribronchial	6
Inguinal glands	3
Posterior mediastinal	2
Peritracheal	2
Clavicular	2

Epigastric glands	2
Portal glands	2
Subclavicular	1
Glands of neck	1
Glands of chest	1
Subdiaphragmatic glands	1
Substernal	1
Perigastric	1
Retrogastic	1
Periaortic	1
Thoracic glands	1
Peritoneal glands	1
Parotid glands	1
Lumbar	1
Celiac	1
"Lymph nodes" not specified	7
Liver	103
Gall-bladder	1
Left Lung	28
Right Lung	22
Both Lungs	16
Root Lungs	2
Pleura	25
Pleuræ	10
Right Pleura	9
Left Pleura	8
Pericardium	39
Heart	6
Left Ventricle	7
Right Ventricle	2
Left Auricle	6
Right Auricle	3
Myocardium	3
Interventricular Septum of Heart	3
Origin Aorta	2
Large Vessels	2
Pulmonary Veins	2
Lower Cava	1
Both Kidneys	32
Left Kidney	15
Right Kidney	11
Left Suprarenal	17
Right Suprarenal	7
Both Suprarenals	14
Spleen	17
Capsule Spleen	1
Pancreas	6
Thyroid	12
Brain	28
Cerebellum	11
Dura Mater	10
Corpus Striatum	1
Cerebral Hemispheres	1
Hypophysis	1
Medulla	1
Cerebrum	1
Spinal Cord	2
Nerves (Left Vagus)	1
Peritoneum	7
Intestines	1
Ileum	1
Diaphragm	6
Œsophagus	3
Stomach	4
Pylorus	1
Gastro-hepatic Ligament	1
Mediastinum	4
Posterior Mediastinum	1
Bladder	2
Right Testicle	1
Uterus	2
Ovaries (1 Left)	2
Skin	4
Left Eye	1
Left Leg	1
Finger-tip	1
Tip of Nose	1
Nasal Septum	1

Skeleton

"Bones"	5
Skull	6
Frontal Bone	3
Parietal Bone	1
Sternum	5
Clavicle	1
Chest Wall	1
Ribs	9
Upper Ribs	1
1st to 7th	1
5th rib	3
6th rib	1
7th to 8th	1
Vertebræ	5
Dorsal	1
3d dorsal	1
7th to 8th dorsal	2
3d cervical	1
7th to 10th	1
Lumbo-sacral	1

Femur	3
Right Humerus	1
Long Bones	1
Iliac Fossa	1
Shoulder Joint	1

Muscles

Intercostal	3
Trunk	1
Back and Abdomen	1
Chest	1
Back	1
Not Specified	2
No Metastases	33
Metastases not Mentioned	57

D

Sarcoma

METASTASES

Lymph Nodes

Bronchial	15
Mediastinal	10
Retroperitoneal	5
Axillary	5
Cervical	4
Peribronchial	3
Hilus	3
Inguinal	2
Posterior mediastinal	1
Regionary	1
Mesenteric	1
Infraclavicular	1
Supraclavicular	1
Retrobronchial	1
"Lymph nodes"	1
Various	1
Liver	16
Right Lung	8
Left Lung	2
Side not Specified	1
Pleura	4
Pericardium	4
Heart Muscle	1
Left Ventricle	1
Left Auricle	1
Right Auricle	1
Auricles	1
Brain	3
Spinal Dura	1
Spinal Cord	2
Left Recurrent	1
Anterior Mediastinum	1
Diaphragm	1
Hepato-duodenal Ligament	1
Pancreas	5
Spleen	5
Peritoneum	1
Œsophagus	2
Kidneys	3
Right Kidney	1
Left Kidney	1
Skin	1
Lower cava	1
Vertebræ	3
Right iliac	1
Left shoulder	1
Scapula	1
Ribs (2, 3, 4) (9, 10, 11)	1
Right humerus	1
Humerus (side not stated)	1
No Metastases	24
Metastases not Mentioned	15

Note. — It was found practically impossible to classify the metastases according to a uniform system. They were, therefore, recorded as reported by the authors and grouped as nearly as feasible according to the various organs and tissues affected.

TABLES

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
1	ADLER	M	66	L	Admitted to hospital in moribund condition with symptoms interpreted as pulmonary phthisis. No history obtainable
2	ADLER	M	67	R	In hospital for 3 weeks. For 3 months cough and pain in right chest. Progressive loss of strength and flesh, anorexia and nausea. Flatness and absence of voice and breathing over greater part of right lung. 800 c.c. of bloody serum aspirated from right pleura. Irregular fever up to 102. Acetone in urine. Hæmoglobin 65; reds 4,500,000; whites 15,000
3	ADLER	M	67	L	No heredity. Inveterate smoker. Stout, healthy-looking. Harassing cough, pain in left upper chest, dyspnœa on slight exertion. For several years repeated profuse hæmoptysis. Flatness, absence of voice and breathing over left anterior chest. No fever. Sudden death from profuse hæmoptysis. Approximate duration of disease about 4 years
4	ADLER, Packard, M., Med. News, Feb. 18, 1905	M	55	R	No heredity. For 5 years cough and pain in right chest. Had periods where cough and pain would disappear. For 2 years cough permanent and more harassing; gradually increasing dyspnœa. Veins over chest and upper abdomen enormously dilated and tortuous. Complete flatness, absence of voice and breathing over anterior right chest. No bulging. Occasional profuse hæmoptysis. Hæmoglobin 62; red cells 3,980,000; white cells 14,300; lymphocytes 24%. Later enlargement of axillary and supraclavicular lymph nodes. 600 c.c. clear serum aspirated from right pleura. Death in a hansom-cab from hæmoptysis
5	ADLER	M	26	R	Father died of cancer of stomach. Patient always in good health until about 1½ months before admission. Pain in right chest; no cough; no expectoration. Increasing debility.

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
	Heart dislocated to right; right lung normal. Sanguinolent effusion in left pleura; pleura much thickened. In upper left lobe a tumor size of two fists with cavity in centre	Regionary lymph nodes, liver, both kidneys and spleen	Medullary carcinoma	It was practically impossible in microscopic examination of the main tumor in the left lung to say whether we had to deal with a round-celled sarcoma or with a carcinoma. Only the study of the metastases made the diagnosis of carcinoma absolutely certain
Scant, mucopurulent, at times bloody, no tubercle bacilli or tumor elements	Medullary carcinoma	Pericardium, heart muscle, kidneys, left suprarenal, bronchial and mediastinal lymph nodes		
Mucopurulent, sometimes bloody for weeks, no tubercle bacilli or tumor elements	Large tumor involving upper portion of lower and lower portion of upper lobe of left lung, containing an irregular cavity filled with blood and broken down tumor material, and into which stumps of vessels and bronchi infiltrated with tumor material still project. The rest of left lung diffusely infiltrated with tumor along the track of the bronchial ramifications	Pericardium, bronchial, mediastinal, and retroperitoneal lymph nodes and liver	Typical carcinoma of glandular type	
None at first, then mucopurulent and remains bloody; no tubercle bacilli or tumor elements	Tumor of the right main bronchus extending to the posterior portion of the left bronchus. Tumor penetrates the right lung in all directions to the pleura along the track of the bronchial ramifications. Numerous bronchiectatic dilatations. Compression of upper cava, right pulmonary and right innominate arteries	Pleural surface of right diaphragm, pericardium, regionary lymph nodes and left lung	Epithelioma	
None	Right pleural cavity completely filled with huge masses of old fibrinous blood clot, and entire lung pushed against posterior chest wall	Right auricle, cervical, mediastinal, and bronchial		

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
					Subsequently hoarseness, swelling of right side of face, right chest, arm, and foot. Impaired respiratory motion of right chest. Flatness over right chest except a rather large area posteriorly where there is increased vocal fremitus and some tympany on percussion. Heart 8 cm. beyond left mammillary line. Irregular areas of bronchial breathing and dulness on left chest. Tympanitic area in right chest steadily diminishes in size
6	ADLER	M	63	R	No heredity. Harassing cough with profuse mucopurulent, sometimes bloody expectoration for some years. Lately loss of weight and strength. Pain and slight dyspnœa on exertion. Complete flatness, diminished voice and breathing sounds to 4th rib on right side. Diagnosis of tumor during life
7	ADLER, Garbat, A. L., American Journ. of Med. Sciences, 1909, Vol. cxxxvii, p. 857	M	63	R	Loss of weight for over a year. Cough, hoarseness, night sweats. Impaired respiratory motion of right chest with diminished voice and breathing anteriorly, flatness posteriorly. In November 150 c.c. bloody serum withdrawn. No characteristic elements. 6 weeks later increasing dulness, high fever. Aspiration 60 c.c. chocolate-colored pus. Thoracotomy. 6 weeks later cholecystitis; 3 stones removed by cholecystotomy. 6 months later soft tumor over right scapula; tumor excised; carcinoma. Increasing weakness; death
8	ADLER	M	52	R	Uncertain history of malignancy in family. Always healthy; no syphilis. For 2 months spitting of blood in the morning. Increasing cough. Slowly

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
	and compressed. Anterior half of right lung completely replaced by tumor. Right auricle, pulmonary artery, and upper cava compressed by tumor. There are thromboses reaching into the right internal jugular and subclavian arteries	lymph nodes		
Mucopurulent, frequently bloody, no tubercle bacilli	Confirmed diagnosis. Records could not be obtained			
Profuse, purulent, bloody, no tubercle bacilli, no tumor cells	Right pleura and diaphragm thickened and adherent. Middle and lower lobe almost entirely replaced by tumor. Bronchiectatic dilatations	Both lungs, liver, bronchial and retroperitoneal lymph nodes	Cylindrical-celled carcinoma. Undoubted origin from bronchial mucous glands	
No tubercle bacilli, but very numerous large "Körnchenzellen"(Lenhartz)	Cavity in right apex surrounded by tumor extending along bronchial vessels to the hilus and to the pleura. Gray hepatization around the tumor	Right pleura; supraclavicular gland	Squamous carcinoma probably originating from small bronchus	
Never bloody, no tubercle bacilli	Clear serum in right pleura. Cancer encircling left main bronchus from bifurcation downward and obstructing its lumen. Bronchiectatic abscesses; thrombosis of left subclavian vein. Degeneration of left recurrent	Bronchial and mediastinal lymph nodes, left pleura, pericardium, and left lobe of thyroid	Scirrhus with unusually large cells having tendency to necrosis	

NO.	AUTHOR	SEX	AGE	RESULT	CLINICAL SYMPTOMS
					...nmia. Intermittent fever up to 103. Paralysis of left recurrent, left pupil contracted; slight ptosis of left eyelid. Later, hyperidrosis of right face and neck. Death 5 months after first serious symptoms.
[illegible]		F	45	F.	...severe symptoms. Oedema of upper part of body, including face, chest, and neck; arms. Superficial veins dilated. Slight cough and expectoration. No fever. Dulness on right chest from interval to nipple, both bases dull, voice diminished; respiration and voice
11	Angelbrecht. Diss. München. 1883. (Über eine primäre Lungengangrän.)	M	32	F.	For 3 months cough, expectoration, hæmoptysis, some fever. Pain in left chest; night sweats. Increasing emaciation; impaired respiratory motion of left chest. Dulness to 8th spinous process posteriorly; bronchial breathing, a few rales. Flatness and loss of breathing and voice at base. Bloody serum removed several times by aspiration. Clinical diagnosis: pulmonary phthisis.
12	Arnot. Diss. Kiel. 1868. After Angelbrecht. (Über jauchige Lungenabscesse.)	M	41	R.	Cough, expectoration, pain, jaundice. No dulness. Temporary improvement. After 1 year dulness over whole right lung; tympanitic percussion note and amphoric breathing at right base. Some fever. Intense pain and dyspnœa. Clinical diagnosis: phthisis and gangrene of right lung.
13	Arnot, Diss. Inc. Edinburgh, 1844, p. 78	M	44	R.	While in perfect health sudden chill, fever, sore throat, cough and symptoms of bronchitis, diagnosed as influenza.

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
No details	Fluid in both pleuræ. Tumor at root of right lung. Compression of upper cava	No details	Not given	Author says: "Tumor is probably sarcoma, originating from bronchial glands at root." This seems doubtful; more probably a bronchial carcinoma
Mucopurulent, no bacilli	Bloody fluid in left pleura. Whole left lung retracted and compressed; studded with tumor nodules. Bronchi filled and surrounded with similar tumors. Tumor nodules over costal and pulmonary pleura and diaphragm	No details	Alveolar structure, voluminous stroma, polymorphous and typical cylindrical epithelial cells; areas of glandular arrangement	
Not stated	Cancer of right main bronchus and its branches. Chronic pneumonia and bronchiectases; gangrene of lung; compression of upper cava	Bronchial, mediastinal, cervical, and retroperitoneal lymph nodes. Perforation of cancerous lymph nodes into œsophagus	Alveolar structure, origin from surface epithelium of main bronchus	
Bloody	Serious effusion in right pleura. Tumor in right lower lobe with cavity in its centre. Right main bronchus obstructed by lardaceous neoplasm, also bronchus of lower lobe almost completely occluded. Compression of upper cava and recurrent laryngeal	Right lung, bronchial, mediastinal, and cervical lymph nodes and right kidney	Not given	Probably carcinoma of bronchus of right lower lobe
Not stated	Entire right lung except a small remnant at apex converted into tumor, eroding several ribs. Tumor contains several large cysts filled with dark fluid. Everything else in body normal	None	Not given	Tumor is called cysto-carcinoma of lung

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
15	AUFRECHT, Nothnagel Handbuch d. Spec. Path. u. Therapie, Vol. XIV, 1st Ed., 1899, p. 370 ff. Das Lungencarcinom	M	65	R	Dulness over right middle and lower lobe. Diminished breathing; loss of fremitus. No fever. Nutrition good. Dyspnœa on exertion. Aspiration negative. Increasing weakness. Duration of disease 14 weeks
16	Loc. cit.	M	58	L	Father died of cancer of stomach. Patient always healthy. Commenced with cough and dyspnœa; later effusion in left pleura. Aspiration 2300 c.c. bloody serum; breathing becomes better; *dulness remains*. Sudden death from pulmonary œdœma. Duration about 1 year. Clinical diagnosis: pleurisy
17	Loc. cit.	M	46	R	For 8 months "inflammation of lung and pleura." For 4 months dyspnœa. On admission immediate resection of ribs with discharge of 3000 c.c. of pus from right pleura. *No relief after operation*. Increasing stridor and dyspnœa. No fever. Enlargement of supraclavicular glands. Tumor size of apple in liver. Paralysis of right vocal cord. Death 26 days after operation. Diagnosis made during life
18	AUGIER, G. AND DESPLATS, N., Journ. de Soc. Méd. de Lille, 1883	M	69	R	Fever, dyspnœa, dysphagia, pain in chest. Flatness to 3d interspace; absence of breathing
19	AUVARD, Bullet. Soc. Anat. de Paris, 1882, 96–99	M	56	L	Sick 5½ months. Dyspnœa, pain in left chest. Dulness over entire left side. Diminished fremitus; absence of breathing at base; further up harsh bronchial respiration. Heart displaced toward right. No cachexia. Later anorexia; some fever toward evening. Chest aspirated without result. Later œdœma and albuminuria
20	BARGUM, Diss. Kiel, 1897 Ein Fall von primärem Krebs der Trachea und des rechten Bronchus	F	62	R	No heredity. 5 weeks after recovery from some acute disease with cough and fever, swelling of face and neck, later of chest. Dyspnœa and cough especially after eating. Cyanosis. Area of dulness with diminished voice and breathing over right lower chest. Nothing else on lungs. Some effusion in right pleura
21	BARTH, H. Le Bull. Méd. Paris, 1902, Vol. XVI, Pt. 2, p. 757	F	37	L	Small, poorly nourished woman. Repeated attacks of bronchitis. Present illness began only 5 days before admission with cough, fever, and chill.

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
Mucopurulent, mixed with blood	Diffuse medullary carcinoma in lower portion middle lobe	Mediastinal lymph nodes	Not given	
Not stated	Left lower lobe converted into a firm tumor in which only the larger bronchi can be distinguished; centre broken down	Liver	Not given	
Occasionally bloody	Carcinoma probably of right main bronchus obstructing trachea and bronchus	Mediastinal and tracheal lymph nodes and liver	Not given	
Bloody	Upper right lobe almost completely replaced by soft cheese-like tumor. Pleura thickened; bronchi compressed. Remainder of right lung pneumonic hepatization	Bronchial and tracheal lymph nodes	Not given	Tumor simply designated as cancer
Not stated	Entire left lung one mass of white encephaloid tumor containing many cavities. Granulated tumor on pericardium	Mediastinal and bronchial lymph nodes	Tumor simply designated as encephaloid cancer	
None	Beginning of right main bronchus and wall of trachea infiltrated with tumor. Secondary bronchus also obliterated by tumor. Bronchiectatic cavities in right lower lobe. Compression of right jugular, innominate, and axillary veins, also upper cava. Abundant effusion in right pleura	Regionary lymph nodes	No details	
Abundant, purely mucous, no blood,	Right lung healthy except old and healed tubercular foci in apex. Left pleura adherent and whole left lung	Absolutely not a secondary deposit throughout	Alveolar structure; polymorphous epithe-	Remarkable points about this case are the pleurisy with little effusion, the

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
	Cancer primitif oblitérant de la grosse bronche gauche; Bronchopneumonie tuberculeuse du Poumon correspondent				4 days before admission pain in left chest. On examination impaired respiratory motion of left chest; slight dulness at base; feeble respiration and pleuritic friction. Fine rales over whole of chest. Fever up to 40° C. Diagnosed as grippe (which was then epidemic) with pleuritic complications and the possibility of tuberculosis. Next day everything improved except left lung, which remained the same. Puncture over left chest withdrew clear serum without tumor elements, tubercle bacilli, blood, or lymphocytes. Later severe pain over left nipple, intense dyspnœa, high fever, diarrhœa, and vomiting. Later series of severe chills and hectic fever. About month after admission retraction of left chest, marked dyspnœa, much cough, rapid emaciation. Later absolute absence of voice and breathing; flat percussion note; later cyanosis and signs of cavity in left upper lobe. Death about 3 months after admission to hospital
22	BEALE, Med. Times & Gaz., London, 1869, II, 382	M	41	L	Loss of flesh, pain in left chest, profuse perspiration; dry cough. Flatness over left chest; no fremitus. Heart displaced; some bulging of lower intercostal spaces. Dilatation of superficial veins. Progressive increase of dulness; increasing cachexia. Later painful secondary tumor in left axilla
23	BEAUFUMÉ, Bull. et Mém. de la Soc. Anat. de Paris, 1902, Jorn., IV, No. 7, p. 654 Cancer massif primitif du Poumon avec Lésions multiples	M	Not stated	R	Old syphilitic with tertiary lesions. Large liver, dyspnœa, cachexia. Bloody effusion in right pleura. Rapid development in 3 months. Clinical diagnosis: cancer of liver with involvement of lung and pleura
24	BECK, HUGO, Zeitschr. f. Heilk., Vol. V, 1884, p. 459. (Path. Festschrift, Prag) Zur Kenntniss des primären Bronchialkrebses	F	57	R	No details
25	Loc. cit.	M	65	R	Clinical diagnosis: tumor of right pleura

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
no tubercle bacilli	consolidated and much smaller than normal. Lower lobe atrophic and retracted. Blood and pus flow from trachea on taking out lung. 3 cm. below bifurcation a round soft tumor arises from wall of left main bronchus, almost completely obstructing bronchus. The whole left lung like a sponge filled with pus is a series of small round tumor areas surrounded by lung tissue apparently not much altered — some solid some softened and broken down in centre, altogether like tubercular foci. Bronchial tumor is not ulcerated but is surrounded by apparently healthy mucous membrane; penetrates down to cartilage	the entire body, not even bronchial or tracheal glands	lial cells. Origin from bronchial mucous membrane. The foci in lung are proven to be tubercular, consisting mainly of typical tubercles in all stages of development and degeneration	complete atelectasis of lung, and the tubercular affection of one side only
None	Entire left lung occupied by tumor; only a thin shell of lung tissue remaining behind and at base	Bronchial, retroperitoneal, and supraclavicular lymph nodes, axilla and pericardium	No details	Author thinks tumor spread along bronchial ramifications and believes that thoracic duct was involved
No details	Liver merely congested. Cancer right lower lobe. Aneurysm of descending aorta; thrombosis azygos veins	Diaphragm, pericardium, and mediastinal lymph nodes	No details	
No details	Medullary tumor of right main bronchus and its ramifications. Bronchiectatic dilatations and lobular pneumonic consolidation in right lung, also some tubercular granulations. Upper cava compressed and infiltrated by tumor	Bronchial nodes at hilus	Alveolar structure; *spindle celled stroma*	Origin from bronchial mucous glands
No details	Cavity in right upper lobe, walls infiltrated with cancer. Medullary cancer in right main bronchus and branches obstructing lumen. Neoplasm extends through lung along bronchial ramifications directly into cavity. Infiltration and compression of upper cava and vena azygos	Right bronchial lymph nodes, pleura, thyroid, liver, both suprarenals	Alveolar structure; large epithelial cells with frequent mucoid degeneration	Origin from bronchial mucous glands

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
26	BEGBIE, J. WARBURTON Archiv. of Med., II, London, 1860–61, p. 145 Case of Mediastinal and Pulmonary Cancer	M	50	R	Always healthy. Cough, husky voice, intense dyspnœa; rapid emaciation. Œdœma right face, neck, arm, and over upper sternum. Dulness to 2d rib; diminished respiratory motion and fremitus. Feeble, stridulous, highly bronchial respiration. Tapping of chest gave temporary relief. In 23 days was tapped 10 times, total amount of clear serum being 550 ounces. Duration of disease about 6 weeks
27	BEHIER, Hôp. de la Petie, Gaz. des Hôp., 45, 1867	F	35	R	Cough, headache, vomiting, fever. Emaciation, intense dyspnœa, neuralgia in right arm. Right chest 3 cm. larger than left. Dulness with tubular breathing and amphoric voice on right upper chest. Enlarged glands over right clavicle
28	BELCHER, W. N., Brooklyn Med. Jour., Vol. V, 1901, p. 703 Primary Carcinoma of the Lung	F	47	L	Always in good health until attack of "grippe pneumonia." Effusion in left pleura; aspiration withdraws seropurulent fluid. Patient improved, but there was an early recurrence and several more aspirations were necessary. One week before death a nodule appeared under the skin on the anterior of left chest
29	BENKERT, Diss. Freiburg. No date Das primäre Lungencarcinom	M	49	R	Pain about sternum; increasing dyspnœa and cyanosis. Œdœma of upper part of body, especially left arm. Dilatation of veins of chest. Left lung normal. Flatness over upper right chest; dulness below. Bronchial respiration. Enlargement of axillary lymph nodes
30	BENKERT, Loc. cit	M	58	R	Burning pain in right arm and neck. Cyanosis of face. Œdœma of neck and both arms. Clubbed fingers. Dulness posteriorly from 2d dorsal to angle of scapula. Below clavicle anteriorly, bronchial respiration
31	BENKERT, Loc. cit.	M	71	L	No clinical history

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
None	Large "encephaloid" cancer under upper ⅓ of sternum involving nearly all of right upper lobe and obstructing main bronchus. Compression of upper cava and large thoracic veins	No details	"Distinct cancer cells"	Probably bronchial carcinoma
None	Irregular nodular, hard, white tumor, size of fist in right middle lobe	Right pleura, glands of neck, mediastinal lymph nodes compressing trachea	Author states that tumor contains typical cancer cells	
No details	Bloody fluid in left pleura, thickening of left pleura, pericardium, and left half of anterior mediastinum with hard nodular tumor masses connecting directly with nodule under the skin. Entire anterior left lung infiltrated with hard white tumor	Bronchial glands, pleura, and pericardium	Scirrhus with cuboidal cells	
Bloody, contains spirals and numerous large epithelial cells	Bloody serum in right pleura and in pericardium. In mediastinum a tumor extending downward to the right, which involves right upper lobe. Compression of right auricle; thrombosis of jugular veins; compression of innominate and subclavian, also trachea	Axillary lymph nodes, tracheal, bronchial, mediastinal, and mesenteric lymph nodes. Pericardium left suprarenal. Small nodule, 2 cm in diameter in ileum	Typical medullary carcinoma	It is probable that the small tumor in the ileum was primary
No tubercle bacilli, numerous epithelioid cells	1000 c.c. clear serum in left pleura. Right apex firmly adherent to ribs by tumor masses which extend through lung and penetrate trachea immediately above bifurcation	Tracheal and bronchial lymph nodes	Typical pavement epithelium cancer	
No details	Upper part of left lung extremely soft tumor, nodulated with fibrous strands between nodules. Erosion of 2d to 5th dorsal vertebræ by neoplasm	No details	No details	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
32	BENKERT, Loc. cit.	F	56	L	No clinical history
33	BENNETT, J. HUGHES, Edinburgh, 1849, p. 43 Cancerous and Cancroid Growths	M	45	L	Pain, dry cough, dyspnœa. Left chest less voluminous than right. General dulness over left chest. Flatness below clavicle. At apex bronchial respiration; below faint and diminished. Increasing emaciation and cachexia
34	BERNHEIM AND SIMON, Revue Méd. de l'Est, Nancy, 1886	F	39	R	Pain, radiating into arm and back. Dyspnœa; effusion in right chest. By aspiration 2000 c.c. of clear serum; smaller quantities are subsequently aspirated, later becoming hæmorrhagic
35	BERNSTEIN, A., Diss. München, 1909 Zur klinischen Diagnose des primären Lungencarcinoms	M	53	L	History of lues and urinary troubles. Well until 5 years before admission, when urinary difficulties began. Three weeks before admission painful micturition, feeling of great weakness, fever, much cough, stabbing pain in chest, numbness in both hands. Right apex slightly dull; many rales. Later dulness left base with diminished respiration. Albumin in urine. Clinical diagnosis: tabes dorsalis, phthisis pulmonalis; neoplasm. Death about 5 weeks after admission
36	BETSCHART, Virchows Arch., 142, 1895 Über die Diagnose maligner Lungentumoren aus dem Sputum	F	54	R	No clinical history
37	BEVACQUA, A., Giornale internazionale delle Scienze Mediche, 1904, p. 625 Sul Carcinoma cilindrico primitivo del Pulmone	M	39	R	No heredity. Slight dulness, increased vocal fremitus and some moist rales in right subscapular region. All the rest of lung normal. No fever; very little cough at first. History of syphilitic infection. Pain for about a year, particularly in arms, head, and tibiæ. Increasing cough and expectoration; fever and night sweats. Pain at right base; signs of cavity in lung. Diarrhœa. Clinical diagnosis: tuberculosis

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
No details	Tumor at hilus of left lung adherent to pericardium. Right lung normal	Lymph nodes	Pavement celled carcinoma	Author considers the alveolar epithelium the starting point of the main tumor in the last 3 cases
No details	Upper left lobe dense yellowish-white tumor size of a large orange. Isolated nodules of cancer in left lung surrounding large bronchial tubes. Heart, right lung, and all other organs normal	Bronchial glands and pericardium	No details	
One small hæmoptysis	Chocolate colored fluid in right pleura. Right lung infiltrated throughout with firm, white tumors; bronchiectatic dilatations	Left pleura and peritoneum, both of which are studded with small nodules like tubercles	Merely stated that it is medullary cancer	
Abundant, mucoid, no tubercle bacilli	Simply says carcinoma of left lower lobe. A typical catarrhal hæmorrhagic pneumonia	Left peribronchial glands and in liver	Carcinoma simplex (sic) originating from bronchial mucous membrane	
Sputum contained numerous epithelial cells from which diagnosis of tumor was made during life	Cancerous infiltration of right lower lobe; also a separate nodule not sharply bounded. Lymphatics largely injected with tumor masses	Right upper lobe and corpus striatum of the brain	Cylindrical celled carcinoma	Bronchial surface epithelium stated as starting point
At first scant, later abundant, never tubercle bacilli	Left lung normal; right lung adherent; grayish infiltration in centre of lower lobe in which pulmonary structure is no longer discernible. Cheesy deposits broken down and forming cavities surrounded by numerous miliary nodules. Bronchial glands enlarged; contain cheesy deposits, miliary nodules; some diffusely infiltrated. *Anatomical diagnosis:* tuberculosis of bronchial glands of lower	Bronchial, subclavicular glands and kidneys	Typical cylindrical celled carcinoma, which author considers as originating from bronchial mucous membrane	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
38	BEVERIDGE, Medical Press & Circular, June 2, 1869 Case of Sudden Death	M	64	R	Slight cough; pressure over chest. Able to work until death. Sudden death from hæmoptysis
39	BIRCH-HIRSCHFELD, Arch. f. Heilkunde, 19, 1878 (after Reinhard)	M	50	R	Cough, dyspnœa, weakness and emaciation; insomnia. Dulness over right upper lobe ; rough breathing in front; bronchial breathing behind right upper lobe; rales. Œdœma and dilated veins of upper part of body. Glands over both clavicles enlarged to size of fist. Left lung normal
40	BLUMENTHAL, Diss. Berlin, 1881 (quoted after Fuchs) Zwei Fälle von primären malignen Lungentumoren	M	25	L	Repeated hæmoptysis; increasing dyspnœa. Gradually increasing dulness over whole of left lower lobe with bronchial respiration and increased vocal fremitus; later bulging of left lower chest. First aspiration no fluid; later aspiration effusion which later becomes bloody and under the microscope contains *tumor particles*. Frequent aspirations become necessary; repeated attacks of hæmoptysis
41	BOIX, EMILE, Soc. Anatomique de Paris, 1891, p. 398 Cancer primitif du Poumon gauche, etc.	F	59	L	No previous history. Patient on admission pulseless; œdœma of lower limbs; arrhythmia. Extensive pericardial dulness; flatness and absence of voice and breathing over both sides of chest posteriorly
42	BOTESATO, Diss. Berlin, 1863 De Carcinomate Pulmonum et Pleurae	F	43	L	For 5 years dyspnœa and palpitation on slight exertion; more recently emaciation and weakness, increasing dyspnœa, and severe pain in left chest. Dulness and impaired respiratory motion over whole of left chest; bronchial breathing over upper portion; diminished voice and breathing over lower portion. Right lung normal. Mitral regurgitation. 2000 c.c. bloody fluid aspirated from left chest
43	BÖTTGER, Münch. med. Woch., 1902, p. 272 Ein Fall von primärem Lungencarcinom	M	68	R	Oppression in right chest soon followed by cough, pain, fever. Right lower base: dulness, rales, diminished breathing. Diagnosis influenza. Six months later increased dulness involving the entire lower lobe posteriorly; slight bulging appears; impaired respiratory motion, diminished fremitus. Progressive loss of strength and weight. Increasing dyspnœa, cachexia and pain. Death about 2 years after first complaint

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
	lobe of right lung; tubercular, possibly syphilitic nodules in kidneys			
Not mentioned	Two tumors in right lower lobe size of a hazel nut, one of which ulcerates into the bronchus	None	Not given	
Moderate, occasionally streaked with blood	Entire right upper lobe except at very top converted into nodular medullary tumor extending to enlarged lymph nodes in anterior mediastinum. Compression of upper cava, trachea, and left bronchus	No other metastases	Not given	
Repeated hæmoptysis	Bloody fluid in left pleura. Solid tumor of left lower lobe from hilus to upper part of lobe. Tumor has invaded wall of left main bronchus and extends into its ramifications, completely obliterating the smaller bronchi. Lower part of left lower lobe consists mainly of tumor nodules	Left auricle, pulmonary veins, right auricle, mediastinal and bronchial lymph nodes	Microscopic diagnosis somewhat uncertain. Probably carcinoma of scirrhus-like structure	Probably of bronchial origin
Not mentioned	Large tumor occupying greater portion of upper left lobe. Numerous nodules of various sizes throughout remainder of left lung and pleura. Right lung normal. Effusion of yellow serum in both pleuræ and pericardium	No metastases	Alveolar structure; isomorphous epithelial cells	Author suggests possibility of alveolar origin
Scant	Bloody serum in left chest; clear serum in right. Left pleura studded with tumor nodules; injection of lymphatics with tumor. Large masses of tumor about the root of lung penetrating into the lung itself	Bronchial and mesenteric lymph nodes, both suprarenals	Scirrhus	
Scant, mucoid, occasionally bloody; later raspberry jelly, no tubercle bacilli; a little later elastic fibres	Right lower lobe *not* adherent; no bronchial glands. In the lower lobe surrounded by a thin layer of lung tissue a large tumor, grayish-white, partially firm and hard, partially soft; not sharply defined, but merging into surrounding lung tissue. All other organs healthy	None, not even a single gland	Alveolar structure, much necrosis. Alveoli lined with cylindrical, sometimes cuboidal epithelium; also large giant cells	Notice the very slow and chronic process of the disease, lasting over two years with but very slight systemic disturbance

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
44	BOUILLAND, Journ. complimentaire du Dictionnaire des Sciences médicales, 1826, Vol. 25, p. 289 Observations sur le Cancer des Poumons, etc.	F	50	L	Pain in chest, harassing cough, fever. Increasing weakness and emaciation. Right lung normal. Absence of breathing over left chest. Duration of disease about 7 months
45	BOUYGUES, Bull. de la Soc. Anatom. de Paris, 1888, 657 Cancer primitif du Poumon gauche	F	64	L	No previous serious illness. For 3 months pain in left chest, loss of strength and appetite and much emaciation. Occasionally bloody stools. Some cough; no expectoration; never bloody sputum. Tenderness and some resistance in epigastrium. Flatness over the whole of left lung. Almost entire absence of vocal fremitus. Heart displaced. Hardly any dyspnœa. Some few infraclavicular glands. Clinical diagnosis: tumor of lung secondary to cancer of stomach. Death a few days after admission with intense pain and dyspnœa
46	BOYD, Lancet, 1887, II, 60 Cancer of Bronchial Glands and Lungs	M	38	R	No clinical history
47	LOC. CIT.	F	50	L	No clinical history
48	BREMKER, ARTHUR, Am. Jour. Med. Sciences, Vol. 136, 1903, No. 6, pp. 1020–29 Case of Probable Primary Cancer of the Lung	F	50	L	Pain in left chest, cough. (Shortly before beginning of disease had been assured that heart and lungs were sound.) Dulness, later flatness over lower left lung. Heart displaced to right. Later dyspnœa, bulging of left chest. Bloody serum aspirated
49	BRISTOWE, Lancet, 1860, I, 496	Not mentioned			Not mentioned

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
and large polymorphous pavement cells; once a nest of concentric epithelial cells assuring the diagnosis				
Occasionally bloody, mucoid, later putrid	Left lung closely adherent; pleura much thickened and shrunken; left pleural cavity ⅓ smaller than right. Nearly whole of left lung transformed into scirrhus-like tumor with broken-down areas in its interior. Left main bronchus completely obliterated by tumor	Bronchial and mediastinal glands	Not given	
None	Left pleura thickened and infiltrated with tumor, also diaphragm. Tumor infiltration throughout whole of left lung. Walls of bronchi thickened. Pericardium invaded by tumor. Heart, stomach and all other organs healthy	Right lung, left pleura, liver, mediastinal, bronchial, retroperitoneal lymph nodes, right kidney	Not given	
Not given	Cancer of right main bronchus reaching to bifurcation. Large solid tumor in right lung involving pleura and pericardium	Bronchial lymph nodes	Carcinoma	
Not given	Cancer of root of left lung. Obstruction of left main bronchus by proliferating tumor masses in its lumen	Upper left lobe	Not mentioned	
Not given	1500 c.c. bloody fluid in left pleura. Tumor in left lower lobe	None	Cyst-adenocarcinoma	Possibly from bronchus. (I. A.)
Not given	Specimen exhibited to illustrate peculiar growth of	Not mentioned	Not mentioned	This is undoubtedly a case of primary

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
50	BURD, E. LYCETT, Transact. Path. Soc. London, 1891, p. 55 Primary Carcinoma of Lung	Not given	55	R	Admitted for right pleurisy; discharged 3 weeks later much relieved. Readmitted 16 days thereafter with stitch in side, œdœma of face, arms and chest; much dyspnœa; dilatation of veins over shoulders and front of chest. Slight dulness over limited area in front on right chest. No adventitious lung sounds; no hæmoptysis. Death about 6 weeks after admission
51	CHIARI, Prag. Med. Wochenschr., 1883, p. 497 Zur Kenntniss der Bronchialgeschwülste	F	70	L	No clinical history except "marked marasmus present"
52	CLAISSE, Bulletin a Mémoires de la Société Médicale des Hôp. de Paris, 1899, p. 46 Diagnostic précoce du Cancer du Poumon par l'étude histologique des Crachats	M	50	Not stated	Health had been perfect but began to fail. Nothing could be found on lungs. Expectorated 2 particles about the size of a cherrypit from which diagnosis was made many weeks before symptoms of tumor of lung appeared
53	COATS, Transact. London Path. Soc., Vol. 34, 1888, p. 326 A Case of Multiple Cancerous Tumors, many of them Cystic, in Lungs, Brain, Bones, etc. Primary Tumor probably in the Lung	M	17	R	Entire clinical picture dominated by symptoms from nervous system — vomiting, headache, strabismus, choked disc. Normal temperature, normal respiration. *Nothing pointed to disease of lungs.* Tumors appeared in both femurs, various ribs, and around lumbar spine. Convulsions, coma, death. Duration of disease about 8 months
54	COHN, PAUL, Diss. Leipzig, 1903 Über verhornenden	M	60	L	No clinical history

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
	cancer in lung, radiating along bronchial tubes			cancer of the lung with infiltrations along the bronchial ramifications
Not mentioned	Upper lobe of right lung infiltrated with new growth. Right bronchus occluded	Mediastinal lymph nodes forming large mass adherent to pericardium, root of lung, œsophagus, and great vessels	Not mentioned	
No details	Primary tumor in left lower lobe starting from hilus	Right lung, both pleuræ, bronchial and supraclavicular lymph nodes, liver, spleen, and in cortex and medulla of both cerebral hemispheres	Papillary structure covered with cylindrical epithelium. No ciliated epithelium. Alveolar epithelium and bronchial mucous glands not involved	
No details	Autopsy confirmed clinical diagnosis	No details	Sections of the particles expectorated showed epithelioma	
None	In upper part of lower right lobe large ragged cavity, the walls of which are formed of grayish neoplasm. Solid tumor adherent to bifurcation and bulging into both main bronchi; at two places tumors proliferate into right main bronchus	Bronchial lymph nodes, bones, lungs, pancreas, liver, peritoneum, retroperitoneal and mesenteric lymph nodes, vertebræ, femurs, and at least 22 cystic tumors in brain	Alveolar and cystic structure with cylindrical epithelium at base and irregular, cuboid, and polymorphous cells in interior of alveoli. Much colloid and mucoid material in alveoli and cysts	Cystic adeno-carcinoma, probable origin from bronchial mucous glands
No data	Cavity in left upper lobe with necrotic sequestrum. Tumor infiltration and nod-	Ribs, clavicle, femur, spleen,	Typical cancroid with horny,	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
	Plattenepithelialkrebs der Lunge				
55	DAVY, Lancet, 1882, II, 257	M	43	L	Cough; dulness and bronchial respiration at left apex; pain in left side, impaired respiratory motion. No fremitus, feeble breathing; interspaces flattened; emaciation. Later swelling of liver and ascites
56	DEGEN, Diss. Zürich, 1897 Über einen Fall von primärem Lungencarcinom	F	50	L	No heredity; always healthy until half year before admission when jaundice and pain in abdomen. *Physical examination of lungs negative.* Large, nodulated liver. Clinical diagnosis cancer of liver, possibly cancer of stomach. At no time any symptoms pointing to lungs; no cough; no pain
57	DELORME, Diss. Jena, 1901 Über primäres Lungencarcinom	M	25	L	No heredity; no previous illness. Cough, fever, scant expectoration, retraction of left chest from 1st to 4th ribs; dilated veins; dulness. Diminished respiration but normal vocal fremitus. Large bronchiectatic dilatation at left base. Later clinical picture dominated by paralytic symptoms in left arm and right face. Severe headaches and neuralgias. Later secondary nodules in numerous places — lymph nodes, ribs, sternum, skull. Duration not quite one year
58	DINKLER, Verhand. d. Path. Gesell., 1900, p. 59 Ein Fall von primärem Lungencarcinom	M	21	Both	Diffuse bronchitis and bronchopneumonia
59	Loc. cit, Discussion by Ponick	M	47	L	Healthy and strong. Sudden death from hæmoptysis. No other clinical symptoms
60	Loc. cit.	M	27	L	Irritating laryngeal cough for some weeks; sudden fever. Clinical diagnosis pneumonia. Death in 6 days
61	Loc. cit. Discussion by Langerhans	F	40	Both	No clinical history. Diagnosis made correctly during life
62	DOEMENY, Zeitschr. f. Heilkunde, 1902, III	F	75	R	Cough, pain in side. Dyspnœa

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
	ules around cavity. Wall of afferent bronchus destroyed by tumor but communicates with cavity. Tubercular cicatrix in right apex and at Bauhini's valve	liver, right kidney, left adrenal, retroperitoneal glands. *No metastases in bronchial glands*	pavement epithelium	
Abundant mucous expectoration; no blood	Clear serum in both pleuræ. Left main bronchus compressed by tumor at the hilus penetrating into lung and invading pleura	Bronchial lymph nodes	No details	Tumor is simply called cancer
None	Small, primary infiltrating cancer of left lung with miliary nodules along lymphatics of left pleura. Besides the cancer an eruption of miliary tubercles	Liver, tracheal and bronchial lymph nodes	Squamous celled carcinoma of scirrhous type	
Scant, occasionally tinged with blood	Primary carcinoma of left bronchus; right pulmonary vein perforated by tumor	Pericardium, pleura, bones of skull, both suprarenals, liver, various long bones, sternum, ribs, lymph nodes	Cylindrical celled carcinoma	
No details	Both lungs uniformly diseased, gross aspect resembling most a cheesy pneumonia	Stomach	Carcinoma	
None	Degenerating carcinoma of left main bronchus penetrating into a large branch of the pulmonary artery	No details	No details	
Bloody	Hard carcinoma of left main bronchus. Compression of left pulmonary artery. Hæmorrhagic infarction of left lung	No details	No details	
No data	Extensive diffuse infiltration of both lungs resembling pneumonia	Bronchial lymph nodes	Cylindrical celled carcinoma	
Purulent	Carcinoma of inferior right lobe extending into inferior cava. Chronic tuberculosis of lung	Diaphragm, right lobe of liver	Epithelioma said to originate from pulmonary alveoli	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
63	Loc. cit.	F	67	R	Fever, dyspnœa, palpitation, pain in right side, œdœma of both legs. Bloody effusion in right pleura
64	Loc. cit.	M	47	R	No clinical history given
65	Loc. cit.	M	Not stated	R	Headaches, pain in left chest, dyspnœa; tenderness over right ribs; cyanosis, salivation, clouded vision; cough
66	Loc. cit.	F	63	R	No clinical history
67	Loc. cit.	F	79	Not stated	No clinical history
68	Loc. cit.	M	41	L	Severe headaches, disturbances of vision and hearing; somnolency and paralysis. Clinically diagnosed as tumor or tuberculosis of brain
69	Loc. cit.	F	66	R	Fever, cough, pain in right chest, dyspnœa. Flatness over right posterior base
70	Loc. cit.	M	51	R	Severe cough; flatness right apex anteriorly, bronchial respiration and rales
71	Loc. cit.	M	29	L	Cough, pain in left chest, paresis left arm; fever, severe pain in back. Dulness, diminished breathing in left interscapular space. Bloody fluid in pleura
72	Dorsch, Diss. Tübingen, 1886 (quoted by Pässler) Ein Fall von primärem Lungenkrebs	F	54	R	No clinical history

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
Mucoid and hæmoptysis	Carcinoma of middle and lower right lobes; carcinosis of right lung	Mediastinal lymph nodes, liver, and thyroid	No details	
Not stated	Carcinoma of bronchi and right lung; also *tuberculosis*	Liver, bronchial lymph nodes	Bronchial elements found normal and origin of tumor referred to alveolar epithelium	
Scant	Tumor in main bronchus of right lower lobe ulcerating into lumen and almost completely obstructing it. From bronchus tumor penetrates into right lung	Bronchial lymph nodes left kidney	Carcinoma originating from bronchial epithelium	
No details	Carcinoma of right inferior lobe; tuberculosis of right lung	Not stated	Not stated	
No details	Carcinoma proliferating along bronchi of lower lobe	Bronchial lymph nodes	No details	
Not stated	In left lower lobe, surrounding main bronchus, cancerous mass radiating into surrounding lung tissue	7 metastases in brain; no others	Cylindrical cells of adenomatous structure originating from bronchial mucous glands	
Abundant	Bronchial cancer of right upper lobe; stenosis of bronchus. Old apex tuberculosis	Bronchial and mediastinal lymph nodes, pericardium, both pleuræ	Cylindrical celled adenomatous cancer, originating probably from bronchial mucous glands	
Hæmoptysis	Carcinoma of right bronchus	Bronchial lymph nodes perforating into auricle	No details	
Bloody	Carcinoma of left inferior lobe	Cranium, 6th rib, liver, bronchial and retroperitoneal lymph nodes, brain, right kidney	No details	
No details	Two medullary tumors in right upper lobe, starting from right main bronchus at root of lung and extending into bronchus and upper	Bronchial lymph nodes, lungs, liver, spleen, kid-	Large polymorphous epithelial cells tending to fatty degen-	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
73	DRYSDALE, Medical Press & Circular, Vol. LIII, N.S., London, 1892, p. 528 Case of Cancer of Left Lung	M	51	L	Sick for 3 months with bronchitis; coughed up much pus. Dulness over left base, diminished fremitus and moist rales. Dulness gradually extends; emaciation. At one time cough less troublesome and felt better. More breathing heard over left lung. Later increasing dulness, symptoms of cavity, diarrhœa and death. During life diagnosis was doubtful and malignancy suspected only towards end. Duration about 10 months
74	EBERT, Virch. Arch., Vol. 49, 1870, p. 51 Zur Entwickelung des Epithelioms der Pia und der Lungen	F	47	L	Clinical history refers mainly to brain symptoms. Repeated examinations of chest negative. A few days before death, fever and cough. Dyspnœa and some cyanosis. Examination showed extensive dulness over left lower lobe and bronchial breathing; some friction
75	EBSTEIN, Deut. Med. Wochenschr., 1890, p. 921 Zur Lehre vom Krebs der Bronchien und der Lunge	M	67	R	Family history of cancer. Clinical diagnosis myocarditis, dilatation of heart, emphysema, bronchitis, effusion in right pleural cavity, diabetes. Disease extended over a number of years with occasional improvement. For several years no signs on lungs except some rales. Sudden death from heart failure
76	LOC. CIT.	M	54	L	Pain in left chest extending later to back and right chest. No cough, increasing emaciation, slight temperature; dyspnœa; dulness at left base which remains stationary. Ribs uneven and tender; slight area of dulness on right side. Exploratory puncture negative. Tenderness of liver with enlargement of left lobe. Two days before death tumor appeared on 5th rib right side. 3 days before death stupor and paresis of left upper eyelid. Hæmoglobin 62; reds 3,492,000; whites 32,000
77	EHRICH, Diss. Marburg, 1891 Über das primäre Bronchial- und Lungencarcinom	F	52	L	For some months pain in both sides of chest and between scapulæ, later *paralysis of both* legs. Very slight cough. Clinical picture dominated by typical symptoms of transverse myelitis. Nothing characteristic in lungs. Fever up to 104

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
	cava. Compression of pulmonary arteries	ney, frontal bone, and dura mater	eration	
Mostly profuse, at times offensive, sometimes much pus; occasionally bloody. Several hæmoptyses. No tubercle bacilli	Pleura firmly adherent. Left lung contains numerous abscesses. Large cavity at apex containing pus; larger cavity at base containing blood, pus and debris. Rest of lung infiltrated with cancerous growth radiating from posterior mediastinum	Not mentioned	Not mentioned	Probably bronchial carcinoma from hilus
None	Left lung completely infiltrated with whitish medullary mass; small nodules of similar character in right lung	None	Alveolar structure lined with ciliated epithelium	
None	Main tumor in peribronchial tissue of right lower lobe; strands of tumor in both lungs along peribronchial and perivesicular lymphatics	Peritracheal and retroperitoneal lymph nodes	Cylindrical celled carcinoma	
None	Carcinoma from left main bronchus at root, proliferating into left lower lobe	Regionary lymph nodes, pleura, liver, gall-bladder, kidneys, both suprarenals, brain, pancreas, peritoneum, and various bones	Cylindrical celled carcinoma	
Scant, mucopurulent, no tubercle bacilli, no elastic fibres	Carcinoma in bronchus and tissue of left upper lobe. Continuous propagation to pleura and 6th to 8th dorsal vertebræ with compression myelitis. Diffuse carcinosis of pleura and lung	Bronchial, cervical and retroperitoneal lymph nodes, liver, spleen, kidneys, right suprarenal, thyroid, hy-	No details; origin from bronchial mucous glands	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
78	*Loc. cit.*	M	51	R	No heredity. Always well until short time before admission when some bronchitis and later hemoptysis. No dyspnœa; not much pain. Dulness, diminished respiration and voice over right upper lobe which disappeared later. Marked emaciation. Bloody effusion in right chest; large lymph node in right axilla
79	*Loc. cit.*	F	56	R	Clinical diagnosis: tumor of anterior mediastinum
80	ELSBERG, Diss. Königsberg, 1899 Über disseminirte Miliarkarzinose; besonders der Lungen ohne makroscopisch erkennbaren primären Tumor	M	27	R	No heredity. Spasmodic dry cough worse on lying down; increasing dyspnœa and weakness; some cyanosis; no emaciation; no fever. Right chest somewhat sunken, drags in respiration. Dulness over right chest with loss of breathing and voice. Left chest normal. Blood and urine normal. Duration of disease 4 to 5 months

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
		pophysis, dura and 1st and 7th left ribs		
Mostly bloody; at one time expectoration of villous and bloody masses which contained cancerous material	Carcinoma from right main bronchus involving pleura and chest wall. Ribs perforated by cancer. In lower lobe of right lung a large cavity filled with necrotic tissue and communicating with right bronchus, which is nearly completely obstructed by large proliferating tumor	Pericardium, chest wall, ribs, pleura, bronchial nodes and diaphragm	Alveolar structure with large polymorphous cells	Supposed origin from bronchial mucous glands
No details	Tumor lower part of trachea and right main bronchus and its branches. Complete atelectasis of right lung. Hard, firm, white tumor at the root matting together pleura, trachea, bronchus, large vessels, pericardium, compressing upper part pulmonary artery. Tumor infiltration left lung	Bronchial and mediastinal lymph nodes, left lung, liver, heart	Same as above	
Scant, mucoid, occasionally bloody	Effusion in right chest. Miliary carcinomatous nodules over both lungs and pleuræ. Compression of right bronchus; extensive carcinomatous infiltration through the lymph channels. Papillary and nodular tumor masses in bronchial mucous membrane	Bronchial lymph nodes, peritoneum and *mucous* membrane of bladder	Transition from cylindrical and cuboid to small polyhedral cells	
Often bloody, contains tubercle bacilli	Carcinoma of whole of right lung and right pleura; ulcerating tuberculosis of left upper lobe	No details	Typical cylindrical epithelial cells	
Mucopurulent	Carcinoma of bronchus of right upper lobe extending to main bronchus	Lymph nodes, dura, brain, cerebellum, left suprarenal	Capillary structure covered with epithelium resembling epidermis with prickle cells and kerato-hyaline; also spindle shaped giant cells	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
83	FINLEY & PARKER, Medical Chirur. Trans., London, 1877, Vol. LX, 313–324 Primary Cylindrical-celled Epithelioma of Lung	M	37	L	Pain in left chest, cyanosis, dyspnœa, clubbed fingers, cough, diminished respiratory movement of left chest. Flatness, feeble breathing, diminished fremitus. Aspiration negative. Later enlargement of supraclavicular glands
84	FOÀ, Giorn. della R. Acad. di Med. di Torino, Vol. 42, 1894, p. 111 Un Caso Cancro primitivo del Pulmone		Not stated		No clinical history
85	FRÄNKEL, A. Spezielle Pathologie u. Therapie der Lungenkrankheiten, 1904	M	40	R	In perfect health until taken with chill and fever up to 104; dyspnœa flatness over whole of right lower lobe, loss of fremitus, diminished respiration. Pneumonia with gangrene of lung was diagnosed. Death before 2nd week of disease
86	LOC. CIT.	M	52	L	For 2 years pain, cough, dulness over left lower lobe, feeble bronchial respiration, abundant rales. Dulness gradually extends over greater part of left chest. Puncture negative. Roentgen ray showed complete induration of entire left lung. Later flatness gradually diminishes until percussion note becomes normal everywhere except one small area. Later again becomes tympanitic and finally absolutely flat until death. Inguinal lymph node had been removed and found carcinomatous, which corroborated clinical diagnosis of carcinoma of left lung. Duration about 2½ years
87	FRIEDLANDER, Fortschr. d. Med., 1885, I, p. 307 (after Pässler) Cancroid in einer Lungencaverne	M	Not stated	L	No clinical history
88	FROELICH, Diss. Berlin, 1899 Über das primäre Lungencarcinom	M	42	L	No heredity. Cough, pain in left chest, debility, anorexia; irregular flatness over left chest; diminished voice and respiration. Hæmorrhagic effusion in left pleura; later retraction of left chest, cyanosis, intense dyspnœa; later still amphoric breathing in left

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
Pink	Large, soft, pulpy tumor in upper left lung	Mediastinal and supraclavicular lymph nodes, pleura, both lungs, liver, right kidney	Alveolar arrangement with typical cylindrical cells	
No details	Author calls tumor a broncho-pulmonary cancer	Liver, kidneys	Partly cylindrical, partly polygonal pavement epithelium. Author attributes origin cylindrical epithelium to bronchi; pavement to alveoli	
Mucopurulent, copious; later dirty brown and fœtid	Right lower lobe bronchiectatic cavities filled with puriform secretion. Proliferation into main bronchus of lower lobe of medullary tumor almost completely obstructing lumen and perforating through wall	Lymph nodes at hilus	Cylindrical celled carcinoma	
Occasionally bloody	Occlusion of left main bronchus with nodular medullary tumor size of a man's fist at hilus, extending into lung tissue	Inguinal lymph nodes; general carcinosis of entire left lung	Cylindrical celled carcinoma	
No details	A white medullary mass from bronchus of left upper lobe. Only in this bronchus and in a tubercular cavity in left lung has cancer developed	None	Horny pavement epithelium with typical cancroid pearls	
Scant, occasionally-bloody; later raspberry jelly and contains	Abundant bloody exudate in left chest. Pleura much thickened and adherent on all sides to extensive tumor masses, so that exudate is completely encapsulated. Posterior portion of upper	Both lungs, pleura, pericardium, bronchial, mediastinal, cervical lymph	Pavement epithelium	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
					chest. Enlargement of cervical lymph nodes; nodular enlargement of liver; paralysis of left recurrent; death. Duration of illness about 9 months
89	Loc. cit.	M	77	L	No heredity. Pain in left side, cough. Increasing dulness left chest, bronchial breathing and rales. Retraction of left chest with cessation of respiratory movements. Increasing cachexia. Clinical diagnosis pneumonia and marasmus
90	Fuchs, Diss. München Beiträge zur Kenntniss der primären Geschwulstbildungen in der Lunge	F	32	Both	No clinical history
91	Loc. cit.	F	56	R	No clinical data except that the diagnosis was cerebral atrophy
92	Loc. cit.	M	59	Both	No clinical history except marked emaciation
93	Loc. cit.	M	64	Both	No clinical history except during stay in hospital intestinal obstruction was suspected. Great emaciation
94	Fuchs, Diss. Leipzig, 1890 Beiträge zur Casuistik des primären Lungencarcinoms (after Pässler)	M	73	R	No clinical history
95	Loc. cit.	M	51	R	No clinical history
96	Geipel, Centralbl. f. Allgem. Pathol. u. path. Anat. X, 1899, p. 848	M	70	L	Patient suffered for some time from severe pulmonary trouble. No other clinical history given

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
tumor cells	and lower lobes contains masses of tumor in which are found numerous cavities filled with pus	nodes, œsophagus, liver, *endocardium of right ventricle, bladder*		
At first none, later scant, no tubercle bacilli	Encapsulated bloody exudate in left pleura. Upper left lobe a shell of lung tissue infiltrated with tumor and surrounding cavities filled with putrid and degenerating tumor material	Bronchial lymph nodes	Squamous epithelium	
No details	Primary cylindrical celled carcinoma of both lungs appearing in numerous nodules, many of them confluent. Fibrinous effusion in right chest	No details	Ciliated cylindrical celled epithelium	
No details	Medullary infiltration of right lung with cavity in upper lobe. Foci of red and yellow softening in cortex of left anterior lobe of brain	Numerous in dura	No details	
No details	Primary cancer with nodules in both lungs in great numbers of all sizes. Chronic interstitial pneumonia	None	No details	
No details	Medullary nodules in left upper lobe. Bronchial mucous membrane bulged by nodules. Large cavity in right middle lobe filled with *pedunculated* soft, reddish-brown material. Hæmorrhagic effusion in pericardium with retraction of left lung	Pericardium and liver	No details	
No details	Carcinomatous tumor size of an apple in right lower lobe; softening in interior	None	Pavement epithelium	
No details	Subpleural tumor size of an apple in right upper lobe. Necrotic cavity in interior. Origin from bronchial wall	Right lower lobe, regionary lymph nodes, liver	Cylindrical celled carcinoma	
Not mentioned	Carcinoma of left main bronchus penetrating into left auricle and also into aorta, but not to the intima	Not mentioned	Alveolar structure, cylindrical cells, here and there approaching pavement epithelium	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
97	GOLDSCHMIDT, Corresp.-blatt f. Schweizer Aerzte, 1886, XVI, p. 67–69 Medullar Carcinom der linken Lunge	M	47	L	Progressive emaciation, dyspnœa, pain, dilated superficial veins. Flatness, absence of voice and breathing over greater part of left chest. No fever; no cough. 700 c.c. clear bloody serum aspirated from left chest
98	GOUGEROT, Bull. de la Soc. Anatom. de Paris, 1905, p. 294 Cancer primitif du Poumon (Epithelioma pavimenteux broncho-pulmonaire) a Globes epidermiques	M	46	R	No heredity. Pulmonary tuberculosis of old standing. After grippe, dyspnœa with cough and fever. Later polyuria and polydipsia. Rapid emaciation; some pain. Urine free from albumin or sugar, though over 8000 c.c. voided daily. Later painful points on vertebræ; pains along right arm. Clinical diagnosis tuberculosis
99	GRÜNWALD, Münch. med. Wochenschrift, 1889, No. 32–33 Fall von primärem Pflasterepithelkrebs der Lunge	M	32	L	Pain in chest. Abnormal sensations in throat. Dyspnœa, paralysis of left recurrent laryngeal. At that time heart and lungs found normal. Later dulness over left upper chest; absence of breathing. *Physical signs vary.* Clinical diagnosis tumor of posterior mediastinum compressing heart and lungs and left recurrent nerve. Aspiration practically negative. Some cough. Duration about one year
100	HALL & TRIBE, Lancet, 1905, I Carcinoma of Bronchus and Liver in a Youth of 17 with Glycosuria	M	17	L	For 3 months cough, dyspnœa, emaciation; thereafter intense itching, enormous appetite, polyuria; some cyanosis; œdœma of face, neck, and feet; purpuric spots partly suppurating over the legs. Swellings filled with fluid over scapula, back, anus, and left arm. Bronchial breathing with some rales over left apex. Enlarged nodular liver; some fever. Urine contains much sugar; some diacetic acid. Sudden collapse and death. Duration about 3 months. Clinical diagnosis pyæmia with suspicion of tuberculosis
101	HAMPELN, St. Petersburg Med. Wochenschrift, 1887, No. 17 Fall von primärem Lungen-Pleura Carcinom	M	62	L	No heredity; disease started with slight fever and enlarged spleen; treated as malaria and improved. Later pain in left chest and dyspnœa; pleuritic effusion which was *absorbed without tapping.* Later slight cough followed by emaciation and general cachexia without subjective symptoms. No pain, good breathing, good appetite. Physical signs suggested merely incomplete absorption of pleuritic effusion. Duration of disease probably not more than one year

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
None	Entire left lung except upper portion of upper lobe converted into medullary cancer	*None*	Not mentioned	
Mucopurulent, often bloody, contains tubercle bacilli	Neoplasm, involving entire right upper lobe with cavity. Right main bronchus at root obstructed by tumor up to bifurcation. Compression of tracheal and cervical plexus	Peritracheal, peribronchial lymph nodes; left kidney	Typical pavement epithelium with horny pearls. Origin from bronchus	
Scant, occasionally bloody	Solid tumor size of fist in central portion left lower lobe. No cavities. All bronchi compressed; œsophagus matted to trachea by tumor	Bronchial and mediastinal lymph nodes; left ventricle and 2 nodules in liver	Pavement epithelium	
Mucopurulent, bloody, no tubercle bacilli	Irregular tumor, lower lobe of left lung, starting from hilus, spreading along bronchus into lung; main bronchus almost occluded. Pancreas normal	Upper lobe, liver, retroperitoneal and cervical lymph nodes, parts of skull	Columnar celled carcinoma. Origin from bronchus	
Scant, gelatinous, occasionally bloody or pink. Microscopic examination showed numerous epithelial cells suggesting tumor, from which alone the	In lower lobe a tumor the size of a fist, broken down in centre, but surrounded by normal lung tissue	None		

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
102	HANDFORD, London Path. Trans., Vol. 39, p. 48 Two Cases of Mediastinal Cancer	M	45	L	Cough and failing health 6 months before admission. Loss of flesh, pain between shoulders and at sternum. Difficulty in swallowing anything but fluids. On admission: difficulty in swallowing most urgent symptom and steadily increasing. Profuse hæmoptysis and death. Duration of disease about 7 months
103	Loc. cit.	M	40	R	Cough more or less for 20 years. 5 years ago profuse hæmorrhage. 2 years ago loss of voice for 2 months; unable to work for 18 months; much loss of flesh; muscular pains. Hectic temperature, occasionally up to 104½. Dulness over nearly all of right lung, especially over lower lobe. Later pleuritic effusion in right chest; aspiration 30 ounces of turbid serum. Later swellings in upper humerus, right deltoid, left upper arm and left thigh. Smaller nodules in scalp. Sudden death from hæmoptysis
104	HANDFORD, London Path. Trans., Vol. 40, p. 40 Primary Carcinoma of Left Bronchus	M	64	L	Well until 5 years before admission; then had fall and hurt chest. Cough and loss of flesh since. Deficient expansion of left chest; dull percussion especially in upper part. Feeble, distant tubular breathing, finally complete absence of breathing sounds. Paroxysms of dyspnœa; hoarseness. Clinical diagnosis: new growth or aneurysm pressing on left main bronchus. Death from profuse hæmoptysis. Duration of disease about 6 months
105	HANDFORD, London Path. Trans., Vol. 41, p. 37 Carcinoma of Root of Lung (after Pässler)	M	63	L	None given
106	HARBITZ, FRANCIS, Norsk Mag. f. Laegevidenskaben., Aug., 1903, p. 715 Primärer Krebs in einer Lunge mit bronchiectatischen Cavernen; Metastasen im Gehirn und in dem	F	49	L	Tubercular family history. Had syphilis. At 34 years had influenza and coughed ever since. Sudden acute pains in both sides of chest; bedridden since. Sweating; intense thirst. On admission dulness over left lung; rales over both lungs. To the left of vertebral column on level with 10th rib a long, pseudo-fluctuating mass. Fusi-

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
diagnosis of tumor of the lung was made during life				
Mucopurulent and bloody	Large tumor in left lower lobe covered by thickened, infiltrated pleura. Tumor proliferates into mediastinum, where there is large cavity filled with bloody fluid communicating with main bronchus and left auricle	Mediastinum, cervical lymph nodes, liver, left auricle, pericardium	Typical alveolar structure of scirrhous carcinoma	
Mucopurulent and bloody	Carcinoma of root of right lung spreading along bronchial ramifications and large vessels. In lung tumor masses in parts softened and forming cancerous cavities from which hæmorrhage originated	Bronchial lymph nodes, various muscles of trunk, various bones, skin, kidneys	Alveolar structure, abundant stroma, epithelial cells	
Abundant, frothy, occasionally bloody	Hypostatic pneumonia right lung. New growth had spread along interior of left bronchus, completely filling its lumen, and reaching up into trachea above bifurcation. Numerous small tumor nodules over left visceral pleura	Bronchial and mediastinal lymph nodes, liver	Carcinoma of scirrhous type, originating from mucous membrane of bronchus	
Not stated	Carcinoma of root of left lung, obliterating lower secondary bronchus, and proliferating along bronchial ramifications	Left pleura, liver	Alveolar structure, well developed stroma and abundant epithelial cells	
Mucopurulent, several times pure blood, no tubercle bacilli	Small tumor in rectus abdominis, also in musculature of back near spinal column. Upper surface of right lung studded with nodules often umbilicated. On section lung shows many grayish red tumor nodules, both discrete and confluent. Much	Right lung, brain, cerebellum, ribs, sternum, liver, kidneys, muscles of back and abdomen	Alveolar structure; alveoli lined with high cylindrical cells. Small bronchi contain these cells in active prolif-	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
	Knochensystem				form enlargement of 9th rib in left axilla. Puncture of tumor at 10th rib reveals brown colloid materia containing round or oval cells with fatty degeneration. No fever while in hospital. Died from marasmus days after admission
107	Loc. cit. p. 729	F	49	R	Sick for a long time. Symptoms o chronic œdema of lung with short per cussion note. Ronchi over both lungs Slight cough
108	Loc. cit. (postscript)	M	39	L	Sharp pain in left chest and right arm. Later dyspnœa, dulness ove base of left lung, fremitus in left hy pochondrium. On puncture sanguin olent serum containing lymphocyte and endothelium
109	HARBITZ, Quoted from Zeitschr. f. Krebsforsch., I, 1904, p. 134	F	40	Both	No clinical history given in excerp
110	HARRIS, St. Bartholomew's Hosp. Reports, Vol. 28, 1892, p. 73 Intrathoracic Growths	M	54	R	Cough, dyspnœa, night sweats. Fluid in right chest. Clinical signs those of chronic phthisis, especially at right apex. Duration 11 months
111	HARTMANN, Diss. Kiel, 1896 Über Lungenkrebs vom Bronchus ausgehend	M	69	L	Cough for years; after a cold in creasing cough, dyspnœa and ema ciation. Dulness with diminished bronchial breathing over left bas gradually extending over whole of lef chest. Aspiration 1500 c.c. serou fluid containing fatty epithelial cells

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
	caseous degeneration. Left lung adherent to thoracic wall and smaller than right. Nodules in lung tissue; cavities in lower lobe		eration. Mucoid degeneration	
None	In main bronchus of right lung circular thickening of mucous membrane which protrudes into lumen. In substance of right lung large and small lumps and infiltrations of grayish color	Bronchial and retroperitoneal lymph nodes, pleura and peritoneum	Polymorphous epithelial cells undergoing colloid degeneration	
Mucoid, no tubercle bacilli	Adeno-carcinoma with pronounced mucoid and colloid degeneration	Pleura		
Not mentioned	Bronchiectatic cavities with gelatinous tumor masses in lungs, also broncho-pneumonic foci with cheesy and mucoid degeneration	Pleura, bones, brain	Adeno-carcinoma	Direct origin from bronchial mucous membrane could not be established. Author thinks it probable that tumor was primary in lung
Profuse	Large portion of lower right lobe occupied by neoplasm which is very soft. Old tubercular disease of both apices	Not mentioned	Medullary carcinoma	
Mucoid, never bloody	Carcinoma of left main bronchus with destruction of its walls. Irregular tumor nodules at hilus invading lung along bronchial ramifications. Suppurative pneumonia of entire left lung. Compression of trachea	Bronchial and mediastinal lymph nodes and liver	No details	
No details	Bloody fluid in both pleuræ, which are studded with tumor nodules. Large medullary tumor at left apex ramifying in all directions. Right lung healthy	Pleura, pericardium, interventricular septum of heart, diaphragm, liver and left kidney	Only called "Markschwamm"	
No details	Right lung studded with irregular cancer growths, especially in lower part. Pleura much thickened, cancerous mass in lower portion of left lung compressing a branch of the pulmonary artery	No details	No details	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
114	HILLENBERG, Diss. Kiel, 1893 Ein Fall von primärem Lungenkrebs	M	72	L	After influenza, pain in chest, cough. Flatness with diminished respiration over left apex extending downward. Some dulness over right apex; later symptoms of cavity in left apex. Some tenderness over thoracic vertebræ. Clinical diagnosis tuberculosis. Duration about one year
115	HINTERSTOISSER, Wiener klin. Woch., 1889, II, p. 374 Ein Fall von Karzinom der grossen Luftwege, etc.	M	59	—	Always well. Contusion of chest from fall from horse. Shortly thereafter cough, difficult breathing, hoarseness. Later enlargement of various groups of lymph nodes. Dulness over upper portion of sternum and left chest merging into heart dulness. Paralysis of left vocal cord. Painful, hard swelling tip of right 4th finger. Finger is amputated. Increasing dyspnœa and exhaustion. Duration about one year
116	HITZ, Diss. Zürich, 1887 Ein Beitrag zur Casuistik des primären Lungencarcinoms	F	40	R	No heredity. Syphilis admitted. Fever, cough, emaciation. Gradually increasing symptoms of obstruction of right main bronchus but no other evidence of pulmonary disease. An attack of pneumonia was followed for a time by remarkable improvement of all symptoms. Later increasing dyspnœa, dysphagia, pain in right and left chest, cough, œdœma. Death from exhaustion. Duration about one year
117	HOFMANN, Diss. Zürich, 1893 (after Pässler) Über malig. Lungengeschwülste	M	36	L	Dyspnœa; intense pain in chest
118	Loc. cit.	F	56	R	Intense dyspnœa
119	HORN, OSCAR, Virch. Arch., Vol. 189, 1907, p. 414 Ein Fall von primärem Adeno-carcinom der Lunge mit Cylinderepithel.	F	18	L	About 4 years before death dyspnœa, pain in chest, cough and expectoration. Tympanitic note on left chest to 3rd rib; increasing dulness below with rales; diminished voice and breathing. Profuse hæmoptysis, increasing dyspnœa, cyanosis. Sudden death

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
No tubercle bacilli	Large, degenerating carcinoma of left upper lobe. Cancerous and pneumonic infiltration of left lower lobe	Right lung and spleen	Typical cylindrical celled carcinoma. Author believes origin to be from bronchial surface epithelium	
Mucoid, often bloody. Contains numerous epithelial cells, single and adherent in groups	Carcinoma of trachea and bronchi	Finger-tip, bronchial, mediastinal, cervical, left supraclavicular, right axillary and lumbar lymph nodes	Typical carcinoma	*Diagnosis made during life from sputum*
Mucoid, often bloody, no tubercle bacilli or tumor elements ever found	Right main bronchus almost completely obstructed by tumor proliferating into trachea. Posterior ⅓ of upper lobe infiltrated with hard, firm, tumor; numerous bronchiectatic cavities. Enormous dilatation of left lung	Regionary lymph nodes	Alveolar structure with nests of large polymorphous epithelial cells	
None	Large medullary tumor of entire left lung. Left main bronchus obstructed and compressed. Tumor perforates pulmonary vein and left auricle. Aorta compressed. Tumor proliferates into body of some of the vertebræ	Not mentioned	Not mentioned	
Not mentioned	Medullary tumor of right main bronchus following its ramifications to finest branches. Proliferates upwards beyond bifurcation and into left bronchus	Regionary lymph nodes, both pleuræ and left lung	Not mentioned	
Hæmoptysis, chocolate-colored and fœtid sputum, no tubercle bacilli	Left main bronchus completely closed by tumor; left lung collapsed. Bronchiectatic cavities. Out of a smaller cavity in the upper lobe a tumor mass grows from a broad pedicle and proliferates into one of the larger upper bronchi, filling it and budding into a number of smaller bronchi	A few glands at hilus; *no other metastases*	Glandular structure; typical cylindrical celled epithelium with basal membrane, cuticula and cilia	Origin probably from bronchial mucous membrane

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
120	HOYLE, Jour. Anat. and Physiol., XVIII, 509	Not stated		L	Fever; pain in right side of back. No definite signs on lungs. Death from profuse hæmoptysis
121	HUGHES, H. MARSHALL, Guy's Hospital Reports, VI, 1841, p. 330 Cases of Malignant Disease of the Lung	F	50	R	No heredity. Always healthy until two years ago when caught cold; since then occasional attacks of hæmoptysis. Cough, dyspnœa. Retraction of right chest below clavicle; flatness, increased fremitus, tubular breathing. Dilated and tortuous veins of lower abdomen and right chest. Œdœma of legs. Enlarged lymph node in right axilla and below right clavicle. Duration about 2½ years
122	HELLY, Zeitschr. f. Heilk. Vol., 28, 1907. Path. Anat. p. 105 Ein seltener primärer Lungentumor	F	43	Both	Ill for one year. Physical signs seem to point to tuberculosis. Died before full examination could be made at hospital
123	HERRMANN, Deut. Arch. f. klin. Med., Vol. 63, 1899, p. 583 Zur Symptom. u. Diag.	M	36	R	Jaundice, œdœma of legs, enlarged right supraclavicular glands. Dyspnœa; no fever. Dulness and diminished voice and breathing over right apex. Lungs otherwise normal. En-

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
No details	In upper lobe of left lung irregular cavity surrounded by tumor	Cavity in liver; nodules with soft centres in left kidney, iliac fossa, 3rd dorsal vertebra and 5th rib	Epithelioma with typical nests	
Bloody	Entire upper lobe of right lung converted into medullary tumor with strands extending to middle lobe, with proliferation into right pulmonary artery	Lower lobe, liver, both kidneys, right suprarenal	No details	*Diagnosis made during life* on general considerations
No details	Both lungs contained numerous nodules up to size of walnut and frequently confluent. Boundary between tumor and lung not sharply defined. It was impossible at autopsy to determine whether it was tumor or some inflammatory process	None. Not a single lymph node enlarged or any sign of tumor throughout the body	Alveolar structure of the adenomatous type; high cylindrical, non-ciliated epithelium with occasional goblet cells. Alveoli filled with coagulated mucoid material	Evidently malignant and therefore classed under carcinoma although structure is that of pure adenoma
Jelly-like and bloody, showing under microscope plates of epithelial cells from which *diagnosis is made during life*	Tumor at root of right lung surrounding bronchi; one large bronchus obstructed by medullary tumor. Fœtid bronchitis, cirrhosis of liver, hypertrophic and fatty heart, interstitial nephritis	Bronchial lymph nodes, both lungs, liver	Typical carcinomatous structure	
Bloody expectoration 2 days before death	Hard, whitish-yellow tumor size of a hen's egg in region of right hilus	Not mentioned	Not mentioned	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
125	Loc. cit.	F	51	L	No heredity. Sudden pain followed by cough, dyspnœa, dysphagia, hoarseness, loss of weight. Flatness with absence of voice and breathing over whole of left chest. Hard supraclavicular glands. Aspiration: bloody fluid
126	Loc. cit.	M	51	L	No heredity. On admission complains of rheumatism and emaciation. There is some emphysema and bronchitis; symptoms of alcoholic neuritis; clubbed fingers. *Nothing points to disease of lungs.* Two weeks before death for the first time dulness over left upper lobe with diminished breathing; later absolute flatness over entire left upper lobe. Some swollen cervical glands
127	Loc. cit.	M	55	L	Increasing emaciation and cachexia. Hoarseness; flatness with diminished breathing over left apex. Enlarged nodular liver; absence of free HCl in stomach
128	Herrman, Diss. Greifswald, 1895 Ein Fall von primärem Lungencarcinom	F	58	L	*Father and sister died of cancer.* Increasing dyspnœa, rapid loss of strength, pain in left chest, œdœma of legs, dilated veins of neck. Impaired mobility of left chest. Absolute flatness with bronchial and almost amphoric breathing over whole of left chest except apex. Dislocation of heart to right. Chocolate-colored fluid in left chest. Duration of illness about one year
129	Hildebrandt, Diss. Marburg, 1888 (after Pässler) Zwei Fälle von primärem Lungentumor	F	86	R	Not given
130	Hughes, Loc. cit.	M	43	R	Always healthy. First symptoms incontinence of urine and œdœma of legs. Later severe pain in right chest; cough. On admission, œdœma of legs, right arm, and chest and puffiness of face. Clubbed fingers. Dulness over right chest; absence of breathing sounds. Heart pushed to left. Aspi-

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
Mucopurulent, no tubercle bacilli	Hard tumor starting from hilus and surrounding and following bronchial ramifications	Bronchial and mesenteric lymph nodes, liver and kidneys	Not mentioned	
Often bloody; under microscope great numbers of large, fatty, flat and polymorphous epithelial cells, no tubercle bacilli. From this and cachexia and emaciation *diagnosis was made during life*	Soft tumor in left upper lobe, starting from hilus and containing cavity	Lung, ventricular septum of heart, thyroid, left kidney, left suprarenal	Not mentioned	
Mucopurulent, no tubercle bacilli	Cancer of apex of left lung	Right lung, liver, mesenteric lymph nodes	Not mentioned	
Scant, not bloody	Left main bronchus leads into soft medullary tumor of left lower lobe and along bronchial ramifications to hilus. Entire left lung atelectatic. Encapsulated bloody effusion in pleura	Secondary nodules in right pleura	Pavement epithelium with cell-nests	
Not given	Medullary carcinoma of right main bronchus slightly infiltrating surrounding tissue. Carcinomatous infiltration of right subpleural lymphatics	Pleura	Cylindrical and polyhedral cells	
Currant jelly	Whole of right lung occupied by fungus mass containing irregular cavity in centre	Not mentioned	Not mentioned	Diagnosis made during life from œdœma of right arm and bloody sputum after exclusion of empyema

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
					ration negative. Duration about 6 months
131	HYDE, SALTER, London Lancet, 1869, II, July 3, p. 10 Primary Cancer of the Lung	M	43	R	Always healthy. Swelling of neck and face several months before any other symptoms; then slight dyspnœa, dilatation of superficial veins of chest and upper part of body. Later cough, rapid loss of strength, hoarseness, laryngeal cough. Complete dulness in front almost to base; behind to angle of scapula. Bronchial respiration; no rales. Later cyanosis; absence of voice and breathing sounds
132	JACCOUD, Leçons de Clin. Méd. 1871–72, p. 454 Cancer de Poumon	M	50	R	No heredity. Cough for some years. Slight oppression on right chest. Increasing loss of strength and flesh. Later dyspnœa, cough, pain in right chest. Dulness on right lung from base to angle of scapula; diminished voice and breathing. Flatness in region of hilus with bronchial respiration. Diagnosis made during life
133	JAPHA, Diss. Berlin, 1892 Über primären Lungenkrebs	M	49	R	Fever, pain in chest, cough. Dulness over right upper lobe; clubbed fingers. Later symptoms cavity right apex. Emaciation
134	LOC. CIT.	M	48	R	Dyspnœa, pain, cyanosis; pleuritic effusion. Several aspirations yield large quantities of clear serum, later bloody or chocolate-brown. Dilatation of veins of chest
135	LOC. CIT.	M	51	L	Severe dyspnœa, distress in stomach; pain in left chest. Flatness over left chest with symptoms of pleuritic effusion. Repeated aspirations yield brown fluid. Increasing cachexia; enormous dyspnœa
136	LOC. CIT.	M	58	R	Pain in right chest; pleuritic effusion. Increasing debility and *bradycardia*. Dulness right upper lobe with diminished respiration. Ulcerating tumor skin of abdomen. Swelling of head of right humerus

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
Often profuse and bloody, containing peculiar heavy pellets	Nearly whole of right lung converted into "encephaloid cancer." Heart pushed almost horizontal. Almost complete compression of upper cava. Compression of trachea and right main bronchus. Cavities and softening in various places	Not mentioned	Not mentioned	Diagnosis made during life
Bloody, several hæmoptyses	Voluminous mass of "encephaloid cancer" at right hilus, penetrating lung and connecting with bronchial glands. Bronchi and vessels throughout tumor enveloped, but not compressed by neoplasm. Bloody effusion in pericardium	Right lung, pleuræ, pericardium, around origin of aorta and pulmonary artery and vein; liver, dura eroding into bone and reaching into temporal muscle	No details	Clinical diagnosis of tumor of lung made during life from analysis of physical signs and exclusion of other possibilities
Occasionally bloody, no tubercle bacilli but elastic fibres and pigment	Medullary tumor with cavity in right upper lobe; bronchiectatic cavities	Single lymph node	Very large epithelial cells like pavement cells, but author considers alveolar epithelium as starting point	
Bloody, no tubercle bacilli, later distinct *cancer particles*	Tumor from hilus following along bronchial ramifications in right lower lobe. Complete conversion of bronchial wall into carcinoma	Lymph nodes, pleura and pericardium	Cylindrical and pavement epithelium originating from bronchial mucous membrane	
Hæmorrhagic	Tumor in left lower lobe. Left lung dislocated and compressed by several quarts of fluid. Pleura thickened	Right lung, both pleuræ, regionary lymph nodes, liver and spleen	Cylindrical celled carcinoma probably originating from bronchial wall	
Bloody, no tubercle bacilli	Tumor of right upper lobe with necrotic cavities communicating with bronchi	Right pleura, liver diaphragm, right humerus, skin of abdomen	Flat pavement epithelium with typical cancer nests. Author considers alveolar epithelium as origin	Diagnosis was made during life

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
137	JAMIN, Zentralbl. f. inn. Med., Jan. 1906, No. 1 Ein Fall von Karzinom und Tuberkulose der Lunge intravitam diagnostiziert	M	45	R	Heredity of tuberculosis; active symptoms of tuberculosis. Tubercular cavity of right upper lobe. After treatment at Davos, bacilli disappeared from sputum and tubercular process seemed arrested. Slight elevation of temperature and dry cough continues. Progressive area of absolute flatness in lower right lung. Dyspnœa; symptoms of bronchial obstruction; œdema of legs, dilatation of superficial veins. Increasing cachexia; death from suffocation. Clinical diagnosis: cicatrized tuberculosis of lungs, tubercular cavity of right apex; carcinoma of right lung or pleura
138	JOSEPHSON, ARNOLD, Hygiea, 1903, Ht. 2, p. 139. Zeitschr. f. Krebsforschung, 1904, I, p. 372. Schmidts Jahrb., Vol. 290, p. 220, 1903. Primäres Lungencarcinom	M	77	L (?)	Loss of appetite, emaciation, persistent cough. Left lung posteriorly dulness; diminished respiration and fremitus. Effusion in left pleura
139	KAPPIS, MAX, Münch. Med. Wochensch., 1907, No. 18, p. 88 Hochgradige Eosinophilie des Blutes bei einem malignen Tumor der rechten Lunge	M	59	R	No heredity. Increasing debility and emaciation; harassing cough, effusion in right chest. Heart dislocated to right. Aspiration yields bloody serum. Dulness with loss of breathing and voice sounds. Left lung normal. No reaction with tuberculin. Blood: hæmoglobin 120; reds 6,200,000; whites 50,560–40,700; polynuclears 56.9; eosinophiles 33–39.5%. Aspiration: sanguinolent serum without eosinophiles. Eosinophilia not explained
140	KARMINSKY, Diss. Greifswald, 1898 (after Cohn) Primärer Lungencarci	M	51	L	No clinical history

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
Tubercle bacilli	Tubercular cicatrizations left lung; tubercular cavity right apex. In lower portion right upper lobe firm, fibrous carcinoma. Tumor surrounds large vessels and is supposed to originate from hilus	Wall of right ventricle	Scirrhus with squamous epithelium	
Raspberry jelly. *Cancer cells with mitosis*	No record, merely stated that in centrifuged pleuritic effusion cancer cells with mitosis were found	No details	No details	Diagnosis on basis of sputum made intra vitam. Author casually mentions that since 1897 there occurred in Sabbatsberg Krankrenhaus 10 other cases in which autopsy showed primary cancer of lung
Scant, mucoid, no tubercle bacilli	Large carcinoma in right lower lobe adherent to chest wall, diaphragm, and pericardium. Pneumonic infiltration around tumor with necrosis in centre	Lymph nodes at hilus and around aorta; in sternum, dorsal vertebræ, ribs, liver, left adrenal	Alveolar structure; large polygonal epithelium	Enormous heaping of eosinophiles where there is no tumor
No details	Tumor with cavity in left upper lobe involving afferent bronchus	Two secondary nodules in left upper lobe. Bronchial lymph nodes, left pleura, left kidney, left adrenal and ventricular septum of heart	Typical horny cancroid	
Hæmoptysis	Right upper and middle lobes almost completely converted into tumor with softening in centre. Growth takes origin in large bronchus immediately below first division of right main bronchus where wall of bronchus is infiltrated and penetrated by neoplasm	Liver, stomach, kidneys, brain, pericardium	Typical cancroid with pavement epithelial cells, horny and prickle cells and cell nests. Probable origin from super-	All metastases have structure similar to that of original tumor, except metastases in brain; here they have no horny or prickle cells, but cells are cylindrical and in lower layers polygonal, and tumor

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
142	KASEM-BECK, Centralbl. f. inn. Med. 1898	M	57	L	Dyspnœa, cough, slight fever, pain in left chest. Later severe chills. Dulness over upper portion left chest. Bronchial breathing
143	LOC. CIT.	M	60	L	Cough, dyspnœa, diminished expansion of left chest, dilated superficial veins, enlarged axillary glands. Dulness from left axilla downward; diminished voice and breathing; tenderness
144	KIDD, St. Bartholomew's Hospital Reports, 1883, XIX, 227–234 A Case of Primary Malignant Disease of the Lung	M	36	R	Pain in right chest, cough, clubbed fingers; bulging of right chest. Diminished respiratory movements and breathing sounds; flatness. Left side normal. Aspiration: scant, thin, grumous fluid. Hectic temperature, dyspnœa, anæmia. Duration about 8 months
145	KLÜBER, Diss. Erlangen, 1898 Ein Fall von Bronchialcarcinom und Lungencyste	F	34	R	Apparently healthy woman. Sudden death from extensive burn
146	KNIERIEM, Verhandl. deutsch. pathol. Gesellschaft, 1909, p. 407 Über ein primäres Lungenkarzinom	F	59	R	No clinical history. Admitted moribund and died same day

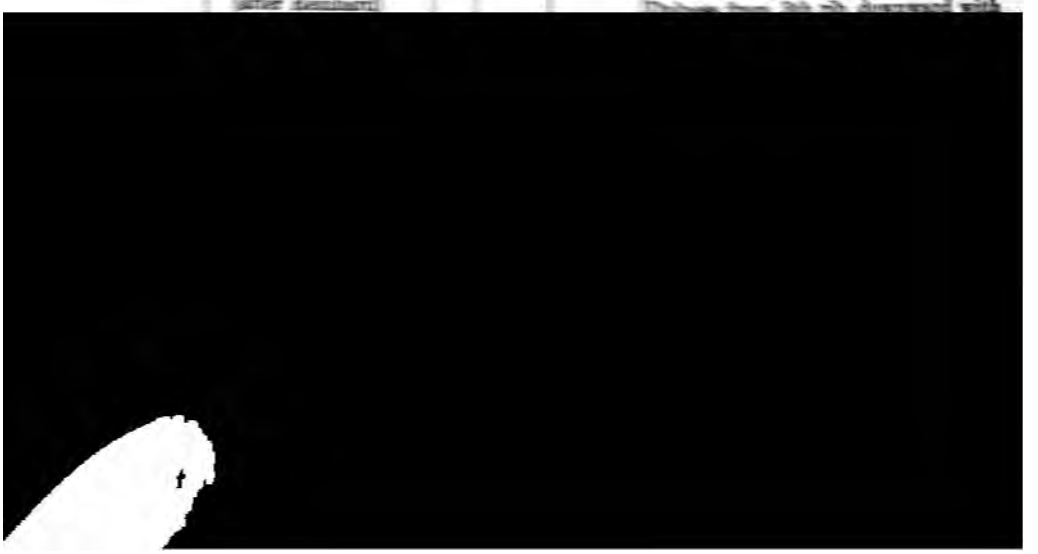
SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
			ficial bronchial epithelium	has distinct papillary structure. Author has some doubt if this is genuine metastasis or a second primary tumor in brain
Mucoid	Primary tumor left upper lobe	None	No details	
No blood	Diffuse cancerous infiltration in lower ¾ of left lung; disseminated nodules in upper third	Bronchial lymph nodes, pleura, liver, head of pancreas	"Carcinoma simplex"	
Currant jelly, some hæmoptysis	Greater portion of right lung converted into tumor, consisting of white, nodular masses; small cavities in upper and middle lobes. Secondary bronchi much compressed. Margin of pleura over right lobe thickened and of medullary appearance	Posterior mediastinal, axillary and retroperitoneal lymph nodes	"Encephaloid cancer"	
None	Medullary white tumor completely obstructing right lower main bronchus, causing large bronchiectatic cyst in right lower lobe	None	Glandular alveolar structure; small cuboidal epithelial cells. Origin from bronchial mucous glands	
No details	Large quantity clear serum in right pleura; right lung adherent. Under pulmonary pleura tumor infiltration following the lymphatics. Middle and lower lobe filled with diffuse gray tumor masses; numerous discrete and confluent nodules in near vicinity. All through the lung miliary gray nodules between the alveoli filled with mucus. Left lung healthy	Lymph nodes of right hilus; retroperitoneal and retrogastric lymph nodes	Two different types—one, distinct alveoles lined with cylindrical cells, and the other, patches consisting of large, irregular polygonal cells arranged in more solid masses. Papillary projections proliferate into the alveoli; transition from flat alveolar epithelium to cubic and high cy-	

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] Münchener Med. Wochenschr., 1895, No. [illegible] Ein Fall von [illegible] Kinde mit [illegible] Lufthusten, etc.	M	[illegible]	3	Cough, depression in chest; flattening of right chest wall. All symptoms of complete and uncomplicated obstruction of right main bronchus, absolute dullness, absence of respiratory and voice sounds. Diagnosis made during life
145	KRAUS. Diss. München, 1892 (after Angelhoff)	M	N	1	For several months dizziness, pain in head and chest. Choked disc both eyes; headache, vomiting. Slight dysp- [illegible] Nothing found on lungs. Clini-

[redacted]

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
			lindrical cells. Large and small alveolar spaces filled with granular tenacious mucus, often containing flat or round and polygonal cells. Larger bronchi show no lesions. Lymph channels in walls of lungs and bronchi contain large carcinoma cells. Origin, epithelium of alveoli and bronchioles	
Mucoid cylinders with coagulated blood in centre; raspberry jelly; occasional hæmoptysis; typical bronchial casts	Complete obstruction of right main bronchus by tumor	Tracheal and bronchial lymph nodes; both right pulmonary veins	Carcinoma	
None	Large carcinoma in left lower lobe	Both lungs, regionary lymph nodes and brain	No details	
No details	Bronchial carcinoma upper left lobe. Gangrene left upper lobe; almost complete obliteration left pulmonary artery. Carcinomatous infiltration of pericardium; carcinomatous degeneration left vagus; ulcerated cancerous masses in upper left main bronchus	Pericardium; left vagus	Alveolar structure, scirrhous stroma; cell nests and pearls	Bronchial mucous glands designated as probable origin
No details	Almost entire left lower lobe occupied by large neoplasm infiltrating surrounding tissue and spreading from central nodule. Wall	Left frontal bone, left kidney, left suprarenal	Similar to preceding case	

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]



SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
	of left lower bronchus infiltrated with cancerous material, ulcerating into lumen			
No details	Wall of left lower bronchus destroyed by tumor infiltrating left lower lobe. Chronic fibrous pneumonia and abscess of left lung; chronic fibrous pleurisy	None	Alveolar structure	Origin from bronchial mucous glands
No details	Uneven nodular tumor in left main bronchus; entire anterior portion of left lung occupied by intensely firm, nodular tumor. Bloody serum in left, clear serum in right pleura	Bronchial, mediastinal, retroperitoneal lymph nodes; left kidney, liver, both suprarenals. (*No bronzed skin*)	Adenomatous structure	Origin from bronchial mucous glands can be demonstrated
No details	Large portion of anterior aspect of right lung infiltrated with thick, firm tumor extending to 4th, 5th, and 6th dorsal vertebræ. Wall of right main bronchus contains nodulated, partly ulcerated tumor masses merging into lung tumor	Bones of skull, vertebræ, cerebellum, thyroid, myocardium, liver, and kidneys	Alveolar structure with pavement epithelium; cuboid and cylindrical epithelium in periphery of alveoli	Origin probably surface epithelium of bronchus
No details	Heart dislocated to right; fluid in left pleura, which is studded with tumor nodules. Left lung everywhere infiltrated with soft tumor. Similar infiltrations in right lung with bronchiectases	Pleura, pericardium	Alveolar and papillary structure. Cylindrical cells	Origin probably from alveolar epithelium
Purulent with occasional hæmorrhage	Right lung except a small part of upper lobe completely consolidated. Tumor masses surround end of trachea and right bronchus, the latter much thickened, infiltrated, and compressed	Regionary lymph nodes and right lobe of liver	No details	
No details	Carcinoma originating from mucous membrane of trachea and bronchi, extending along ramifications replacing bronchial mucous membrane and obstructing lumen	No details except diagnosis made from metastases	Cylindrical cells	
Mucopurulent; no blood, no tubercle bacilli	Large tumor in upper right lobe infiltrating surrounding lung tissue; smaller tumor compressing œsophagus and trachea. Other organs without lesions	No others	No details given	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
158	[illegible] Berlin. klin. Wochenschr. 1874. 411–413 Primäres Lungencarcinom ohne Metastasen	M	42	L	Blow on left thorax. 7 weeks thereafter cough, pain in region of injury. 7 months later increasing debility and dyspnœa. Lower half of thorax in front, flat. Intercostal spaces retracted. Left thorax anteriorly flat-ness, absence of breathing
159	Lannelongue, Marchiafava et Sclavo. Soc. et Méd. Soc. Anatom. de Paris. 1903. No. 5. pp. 745–747. Cancroïde atypique du Poumon	M	42	R	First complaint *15 hours* before admission to hospital. Only cerebral symptoms — headache and vomiting; slight congestion of optic discs. Clinical diagnosis: cerebellar tumor. Duration about 2 weeks
160	Lämmerhirt, Diss. Greifswald, 1901 Zur Casuistik des primären Lungencarcinoms	M	51	R	No heredity. Slight headaches; otherwise healthy. Four apoplectic seizures. Pain in chest; impaired respiratory motion of right chest; dulness over right base; no auscultatory signs. Clinical diagnosis: tumor of brain
161	Loc. cit.	M	51	R	Kick on left chest; some months thereafter weakness and cough. Some weeks later kick on right chest followed by sugillation, cough, bloody expectoration, local tenderness and fever. Increasing pain; hæmoptysis. Dulness over anterior right chest; diminished voice and breathing
162	Laifle, Diss. München, 1895 Über einen Fall von [illegible]	M	37	R	Dyspnœa; œdœma of face and neck. At first nothing on lungs; later dulness over right middle lobe with abolished

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
Occasionally bronchial bloody casts; no cancer cells or tubercle bacilli	Mediastinum and heart displaced towards right. Left upper lobe almost entirely occupied by large tumor. Aorta adherent to but not compressed by tumor. Bronchi obstructed; bronchiectases. Left pulmonary artery compressed	*Absolutely none*	Medullary carcinoma with alveolar structure	
None	Large cyst in left cerebellar lobe filled with fluid containing numerous lymphocytes. One large and many smaller cavities throughout right upper lobe. Walls of cavities and cyst formed of cancerous material. Areas of pulmonic sclerosis around cancerous tissue. All other organs healthy	Glands of hilus	Alveolar structure; polyhedral epithelium	
Scant, not characteristic	Carcinoma of right lower lobe	Bronchial, mediastinal and mesenteric lymph nodes; nodules in brain and cerebellum	Alveolar structure; cylindrical and cuboid cells	
Bloody	Carcinoma of right lower lobe and 5th rib	Right middle lobe, bronchial and supraclavicular lymph nodes	Pavement epithelium	
Occasionally bloody, no tubercle bacilli	Tumor nodules in right upper lobe; bronchiectatic cavities. At bifurcation a nodule extending into right and left main bronchi obstructing lumina. Compression of upper cava	Peribronchial, tracheal, and mediastinal lymph nodes, liver, right kidney and mesenteric glands	None given	
Abundant, mucoid; occasionally blood and "*brain-like*" substance	Left lung converted into "jelly-like" mass. Dilated thoracic veins; cancerous thrombus in aorta	Left lower lobe, right lung, liver, kidneys, supraclavicular glands	Not given	
None	Numerous cancer nodes in right lung; some softening. Large cavity at apex. Cancer nodule on superior cava,	Right testicle	Not given	

TABLE I

				CLINICAL SYMPTOMS
				After 5 months painful tumor in right testicle. Duration of disease 9 months
				For a year symptoms suggesting bronchial obstruction — dyspnœa, etc. but cause of the stenosis could not be determined. Frequent attacks of suffocation in one of which death ensued
				No heredity. Enters hospital on account of rheumatism. Never coughed. No symptoms pointing to heart or lungs. Examination of chest negative. Later some pain in right chest and cough; sudden profuse hæmoptysis. Repeated hæmoptyses thereafter. Gradually increasing dulness over entire right chest. Diminished voice and breathing. Bloody serum in right pleura. Left lung normal. Finally pneumonia of right base
				No heredity. Sense of oppression in chest, cough, rapid loss of weight and strength. Increasing dulness over entire posterior aspect of left lung. Diminished respiration; puncture negative; breast normal
				Pain, dyspnœa, absence of voice and breathing over lower part left chest. Dyspnœa, left thorax increased in size

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
	almost perforating it			
No details	Medullary tumor at bifurcation following along bronchial ramifications	None	Small polyhedral cells, more rarely cylindrical cells	Author traces origin to bronchial mucous glands
No tubercle bacilli or tumor elements	Right diaphragmatic pleurisy. Entire lower lobe transformed into solid tumor. Tumor of right main bronchus, penetrating wall and obstructing bronchus of right upper lobe	None	Alveolar structure; polymorphous cells often fusiform. Mucoid globules in some of the cells	Probable origin bronchial mucous glands
Scant, mucopurulent, no tubercle bacilli	Neoplasm at division of main left bronchus obstructing both branches. Nodules in bronchial walls and in lung tissue around bronchi. Bronchiectatic cavities and patches of gangrene. Left lung collapsed and atelectatic — looks like Roquefort cheese	Lymph nodes at left hilus	Alveolar structure; polymorphous cells, some containing vacuoles with colloid degeneration	
Abundant, mucous, no blood	Large white tumor involving root of left lung and posterior mediastinum, compressing aorta and trachea; œsophagus and left vagus adherent to it	No details	Not given	
No details	Nodules in both lungs suppurating and forming abscesses. Lymphatics throughout lungs enlarged, forming visible network of white strands	Bronchial glands	No details	
Bloody, gelatinous, no tubercle bacilli	Nodules of various sizes in both lungs; diffuse consolidation of upper ¾ of left lobe; cavities throughout lung	None	Alveolar structure with epithelial cells; much degeneration. Channels like veins filled with epithelial cells	
Bloody, no tubercle bacilli, no can-	Right pleura thickened and adherent; lung pressed upward and backward. Large cavity in middle and	Left lung, bronchial glands, glands	Scirrhous cancerous structure. Cuboid and	Cancer was suspected during life but the nephritis masked the diagnosis. Clear

No.	Author	Sex	Age	Side of lesion	Clinical symptoms
	Case of Cancer of the Lung				[illegible] of cyanosis, increasing weakness and dyspnœa. Dulness over upper lung with diminished vesic. murmur. Slight fever. Clubbed fingers. Negative. X-rays showed dense shadow suggestive of tumour, but diagnosis not definite. Duration of disease about four and half
173	[illegible] Ann. Ital. Med. Chir. premiers Essais sur Lungs aux Mam- mifères	M	41	L	All symptoms mainly cerebral — hemiplegia, aphasia, amnesia, paralysis right arm and leg. Nothing abnormal found, chest except some impairment of respiratory action on right side. Chronic diffuse haemorrhagic pachymeningitis. Death while patient was being prepared for operation
174	Lecène. Bull. Soc. Anat. de Paris. 1878. LIII. 721–721	M	38	L	Lachrymation, pain, pains over left apex. Nodules in right cervical and inguinal region
175	Leppla, Max. Diss. Leipzig, 1906. Klinischer Verlauf und Diagnostik des primären Lungenkrebses	M	54	L	Increasing cough and general debility; severe pain; dyspnœa. Heart dislocated to right. Dulness over both apices; bloody serum in both pleurae. Duration 9–10 months. Clinical diagnosis: phthisis
176	Loc. cit.	M	54	R	Cough for years. Flatness and absence of voice and breathing over all of right chest. Heart dislocated to left. Dyspnœa. Bloody serum in

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
cer cells	outer part of right lung with prolongations to apex and base. Remainder of lung infiltrated with white new growth	below diaphragm, liver, kidney, left suprarenal	polymorphous cells. Origin from alveoli	serum spoke against malignancy. It is remarkable that there were no physical signs of so large a cavity
None	Tumor size of a cherry in right lung	Cerebrum, cerebellum, right suprarenal and kidneys	Cylindrical epithelial cells arranged according to glandular type; cells secrete mucous. Same structure in cerebral metastases	Origin bronchial mucous glands
No details	Serous effusion in left pleura. Tumor at apex of left lung	Both pleuræ, mediastinum, cervical and inguinal lymph nodes	"True carcinoma"	
Greenish, no tubercle bacilli	Carcinoma of left lung	Right lower lobe, both pleuræ, retroperitoneal lymph nodes. Bronchial and mediastinal glands not involved		
Mucopurulent, no tubercle bacilli	Carcinoma of right upper bronchus. Hepatization and purulent degeneration of right lung	Skin, left pleura, liver, kidneys, left suprarenal, bronchial, mediastinal and mesenteric glands		
Profuse, bloody	Carcinoma of left bronchus	Skull, upper lobe left lung, pleura, liver, bronchial, mediastinal, epigastric and mesenteric lymph nodes	Not given	
Fœtid, mucopurulent, containing elastic	At place of swelling whitish tumor principally located in lung, surrounded by zone of gangrene. Diffuse infiltration towards hilus.	*None*	Stratified pavement epithelium with nests of horny cells	

TABLE I

	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
					breathing at base. Later cough; enlarged lymph nodes below left clavicle and in both axillæ. Exploratory needle penetrates soft mass. Dilated veins of left chest and neck. Fever; rapid decline. Death two months after first symptoms. Clinical diagnosis: pleuro-pulmonary cancer with secondary gangrene
[illegible]	[illegible] LEPLATE, Thèse de Paris, 1888. (Szeyelowski) Cancer primitif du Poumon	M	60	R	Always well. 4 months previous to admission fever, emaciation, pain in chest, cough. Later dyspnœa, dysphagia. Absolute flatness and loss of voice and breathing over right upper chest anteriorly and posteriorly. Abundant rales. Death from asphyxia. Duration about 5 months
179	LE SOURD, Bull. et Mém. de la Soc. Anat. de Paris, 1899, p. 587. Epithéliome mucoïde primitif du Poumon	M	58	L	No heredity. Severe pneumonia 2 years previous to admission. For one month nervous disturbances in both lower limbs. Dulness left apex; diminished breathing; normal fremitus; intense dyspnœa. Right lung bronchitis and emphysema. No other lesions found anywhere. *Distinct tendency to obesity.* Increasing dyspnœa; physical signs practically the same. Death from suffocation 3 weeks after admission

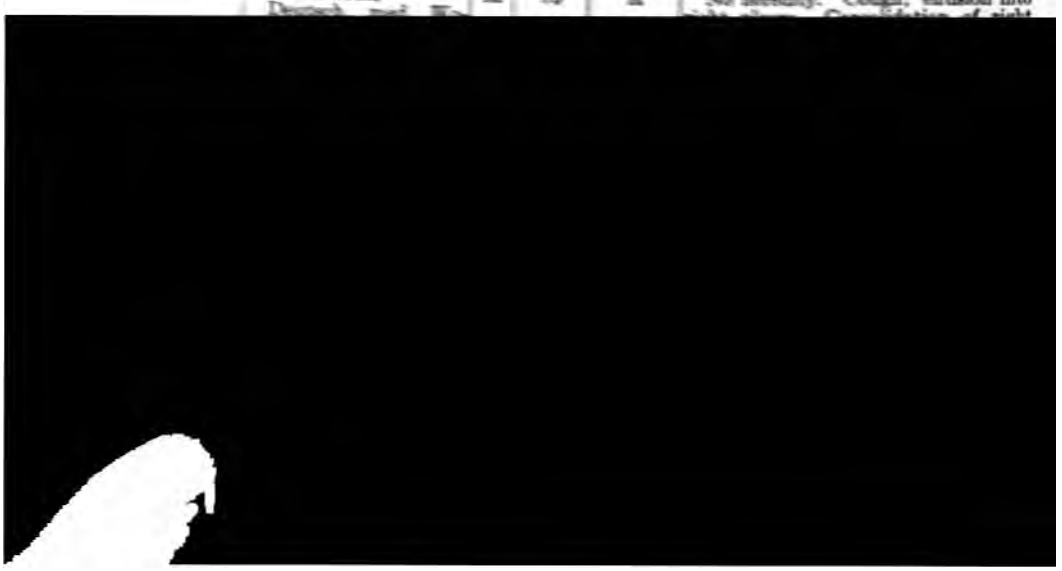
SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
fibres, pus and numerous bacteria	Tumor had penetrated interspace to anterior surface of ribs			
Bloody	Pleura thickened, forming solid cap over right upper lobe. Whole upper lobe converted into tumor which on section looks like Roquefort cheese. Tumor proliferates into bronchi, which are compressed and obliterated. Broncho-pneumonia of lower lobe. Left lung normal	Bronchial and tracheal lymph nodes	No details	
Abundant, mucoid. No special characteristics	Obliteration of left pleural cavity; no pleuritic effusion. Both lungs studded with small nodules. On tip of left lung large whitish-yellow hard tumor; no cavity. No signs of tuberculosis. Hilus glands scarcely enlarged. No other lesions anywhere	Secondary nodules in spinal cord with involvement of some vertebræ	Alveolar structure of lung apparently preserved; alveoles contain cylindrical, cuboid, polymorphous epithelial cells forming here and there ridges and papillary proliferations into alveoles. Epithelial lining in single or multiple layers. Some alveoles not filled with cells contain mucoid fluid. Some peribronchial lymph nodes macroscopically normal, are found on microscopic examination to contain tumor cells	Probably alveolar origin
Mucoid, streaked with blood and raspberry	Primary cancer of left main bronchus, infiltrating into lung along lymphatics and into alveoles	Tracheal and bronchial lymph nodes; suprarenals	Alveolar structure; polymorphous epithelial cells	Origin from bronchial mucous membrane

TABLE I

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
jelly, no tubercle bacilli, no tumor elements				
loody; repeated profuse hæmoptyses	Clear serum in right pleura. Left lung normal. In lower and middle right lobe a soft grayish-white tumor surrounded by shell of lung tissue	Bronchial and tracheal lymph nodes compressing trachea. Mesenteric lymph nodes, liver, pancreas, spleen	Epithelioma with areas of cheesy degeneration	Author places origin from alveolar epithelium
Tone	Left pleura much thickened. Nearly whole left lung converted into thick mass, involving diaphragm, nodulated and traversed by larger and smaller cavities	Bronchial, mediastinal lymph nodes, compressing œsophagus. Lymph nodes at hilus. Liver and spleen	Somewhat atypical epithelioma	Said to originate from alveolar epithelium
t first scant, several profuse hæmoptyses	Right pleura studded with nodules; right upper lobe one solid mass of tumor, proliferating through incision in chest	Mediastinal lymph nodes	Epithelial cancer	

TABLE I

No.	Author	Sex	Age	Lung involved	Clinical symptoms
					cancer made. Increasing dyspnoea and emaciation, profuse haemoptysis; oedema of right chest and lower limbs. Increasing pain. Death. Duration about [illegible] months
[illegible]	[illegible]	M	46	L	No heredity. Always healthy. For 6 months cough, pain in right chest, night sweats, clubbed fingers. Later cedema of entire upper body with cyanosis and dilated veins. Dyspnoea. Dullness lower third right chest; amphoric breathing upper lobe. Dyspnoea. Aspiration clear yellow serum from right pleura; no relief
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	No hereditary history. Not even cancer of breast
[illegible]	[illegible]	M	75	R	No heredity. Cough; effusion into



SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
Abundant, mucoid, no tubercle bacilli	Right main bronchus completely closed by tumor; tumor size of walnut, right upper lobe, encapsulated and surrounded by healthy lung tissue	Bronchial and mediastinal lymph nodes compressing upper cava and brachiocephalic veins	Alveolar structure; cylindrical, polygonal and polymorphous cells	Origin probably from bronchial mucous membrane
No details	In connection with a croupous pneumonia it was found at autopsy that a diffuse increase of connective tissue had taken place in the lung in which the pneumonia had occurred. Numerous larger and smaller white nodules were present which were taken to be newly formed connective tissue. Under the microscope, to the astonishment of all, these nodules as well as the diffuse infiltration were found to be extensive tumor formations. Pleura healthy	Not mentioned	Subpleural nodules mostly cylindrical cells; distinct alveolar structure. Similar nodules disseminated throughout entire lung. Tumor proliferation along peribronchial fibrous tissues. In alveoles of lung, nests and patches of epithelial proliferation which, however, did not fill the alveoles	Author leaves question undecided whether this was a simple endothelial or epithelial proliferation after pneumonic inflammation or a real carcinomatous proliferation. It was probably carcinoma, possibly of alveolar origin. I. A.
No details	Nodules and cancerous infiltration involving nearly entire right lung. Left lung perfectly normal	Nodules in dura perforated bones of skull without causing cerebral symptoms during life	Alveolar structure; large epithelial cells	
Mucoid, later bronchial casts and bloody, no tubercle bacilli	Carcinoma of left upper lobe; perforation of right main bronchus and trachea by tumor. Tumor follows the ramifications of finer bronchi throughout entire lung. Left auricle and upper cava penetrated by tumor; left brachial plexus and aorta surrounded and compressed. Bulging of œsophagus by tumor nodules	Cervical, bronchial, and mediastinal lymph nodes; pericardium and heart muscle	Alveolar structure; epithelial cells often cylindrical	Surface epithelium of smaller bronchi designated as origin

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
188	LUND, O. Virchow-Hirsch Jahresb. 1879, II, p. 143. Norsk mag. f. Lägevid. R. 3, Vol. VIII, p. 142 Primär Lungekräft	F	66	R	Nine months before death cough and emaciation. Later general brain symptoms which completely dominated the clinical picture. Slight dulness and diminished breathing below right clavicle. Clinical diagnosis: tubercular disease of lung and brain
189	MACLACHLAN, London Med. Gaz. 1843, XXXII, p. 23 Primary Cancerous Degeneration and Ulceration of the Lung	M	62	R	Dry cough, dyspnœa; œdœma of eyelids, face, and arms. No pain; no fever. Dulness with absence of voice and breathing over all of right chest. Left lung normal. Duration about 3 months
190	MALASSEZ, Archiv. de Physiol. 1876, II, 353	F	47	Both	Extreme dyspnœa
191	MANDLEBAUM, F. S. Personal communication	M	59	R	Family history of tuberculosis. Healthy until 1907; then cough, pain at right anterior base, loss of weight, dyspnœa on exertion. Examination 6 months later; heart normal; dulness right infraclavicular space, bronchovesicular breathing; flatness and distant bronchial breathing at right base posteriorly. All other organs negative. Clear serum aspirated from right base. Clinical diagnosis: tumor of right lung. Increasing cachexia; partial paralysis of right recurrent laryngeal
192	MARCHIAFAVA, Rivista clinica di Bologna, Serie II, 1873, 4, p. 150 Di un Cancro primitivo del polmone a cellule cilindriche con riproduzione nel cervello a nell osso frontale	M	40	Both	Harassing cough, emaciation, brain symptoms. Clinical diagnosis: chronic tubercular pneumonia. Duration of disease about 8 months
193	MAYNE, Dublin Hospital Gaz. 1857, 2. Proceedings Path. Soc. Dublin, 1856–7, p. 191	F	45	R	Lancinating pain in chest, cough, dyspnœa, cachexia. Dilatation of superficial veins. Impaired respiratory motion of right chest. Flatness and bronchial breathing over all of right chest. Duration 15 months
194	MCMUNN, Irish Hospital Gaz. 1874, II, 69–71	F	60	L	Dyspnœa; chronic bronchitis. Dulness over entire left chest with feeble voice and breathing sounds. Dilatation of superficial veins. Increasing pain. Enlarged glands in left axilla
195	MÉNÉTRIER,	M	68	R	Always well. Debility, loss of flesh,

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
No details	Right main bronchus perforated and obstructed by cancerous tumor penetrating into right upper lobe at the hilus	Lymph nodes of hilus and cerebellum	Simply stated: carcinoma	
Scant	Whole of right chest filled with firm tumor containing numerous cavities. Hard nodular tumor at root of right lung compressing right main bronchus, upper cava and right pulmonary artery	Bronchial and mediastinal lymph nodes	No details	
No details	Numerous nodules in both lungs partly confluent and forming larger tumors	None outside of lungs	Alveolar structure with single layers of cylindrical cells	
Abundant, bloody, no tubercle bacilli, no tumor elements	Entire lower right lobe converted into tumor in centre of which is large cavity containing necrotic matter. Communication between tumor and bronchus of large size, the tumor growing directly into lumen of bronchus	None	Typical carcinoma of squamous cell type with distinct cell nests and incomplete attempts at formation of horny pearls	
No details	Both lungs studded with tumor nodules, some with central breaking down and various kinds of necrosis	Frontal bone, brain, cerebellum	Alveolar structure; alveoli lined with typical cylindrical cells, but filled with polymorphous cells	
Scant, later gelatinous mucus	Large white tumor at hilus of right lung involving nearly all of right lung, which consists of hard white cancer masses interspersed with bluish-gray lung substance. Bronchi dilated	Mediastinal lymph nodes, compressing upper cava		
Mucous, later abundant hæmoptyses	Right lung normal. Left lung converted into a purplish shrunken mass studded with white nodules; cavity in centre of lung. Left bronchus compressed	Axillary and bronchial lymph nodes; pleura, liver and spleen	No details	
No details	Large tumor in right up-	Left lung,	Alveolar	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
	Progrés Méd. 1886, 436–437 Cancer primitif du Poumon				pain in right chest. Persistent diarrhœa, œdœma of upper extremities and face. Dry cough. Dulness over right apex. Clinical diagnosis: some obscure visceral cancer with probable metastases in lungs. Sudden death. Duration about 4 months
196	MERKLEN & GIRARD, Bull. et Mém. de la Soc. Med. des Hop. de Paris, Vol. XVIII, 3d S. 1901, p. 760 Cancer primitif des grosses Bronches	M	45	R	Mother died of cancer. Perfect health until August, 1900. First symptom: difficulty in breathing both when resting or exercising. After a cold, violent cough and severe attacks of suffocation. Hoarseness, dysphagia. Increasing dyspnœa; almost complete aphonia. Dulness over nearly entire right lung. Liver pushed downward. No pleuritic effusion. Total absence of breathing over right apex; lower down intense bronchial respiration with crackling rales at base. Diagnosis of broncho-pneumonic cancer was made during life. Death in an attack of suffocation. Duration about 7 months
197	MEUNIER, Arch. gén. de' Méd. Vol. I, p. 208 De la Pneumonie du Vague	M	70	R	Gout and bronchitis for years. Later dyspnœa, increasing debility, loss of flesh, and severe cough. No fever. Pleuro-pneumonia at right base a few days before death
198	MINSSEN, Diss. Kiel, 1900 Über primären Lungenkrebs	M	43	R	Always well until influenza with pain in right chest, cough, and expectoration. Since then increasing dyspnœa and debility. Dulness over right apex; bronchial and amphoric breathing. Stridorous respiration and cyanosis. No fever. Sudden death from hæmoptysis. Duration of disease about 10 months. Clinical diagnosis: emphysema and pulmonary tuberculosis
199	MOIZARD, Bull. de la Soc. Anat. de Paris, 1875, pp. 732–3 Cancer des Ganglions Bronchiques et du Poumon droit; envahissement de la veine cave supérieure; Pleurésie	M	63	R	Cough; swelling of extremities and face. Right external jugular dilated, not pulsating; right radial artery weaker than left. Heart normal. Dulness over lower ⅔ of right lung posteriorly with diminished voice and breathing. Superficial veins dilated. Fluid in right chest. Diagnosis: pleuritic exudate due to mediastinal tumor at root of lung with compression or thrombosis of superior vena cava

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
	per lobe proliferating into spinal canal. Right bronchus and upper cava compressed; both vagi enveloped in tumor	both pleuræ, regionary lymph nodes, liver, spleen, both *suprarenals*	structure containing cylindrical and polymorphous cells and mucoid degeneration	
Mucopurulent, streaked with blood	Trachea adherent to œsophagus; both surrounded by enlarged lymph nodes. Primary tumor in right main bronchus; lumen almost entirely obstructed by soft, polypoid growth with pedicle at bifurcation. Profuse degeneration of surrounding mucous membrane, thickened, white, and studded with bluish nodules. Left bronchus and lung normal. Right pleura adherent. On section bronchi filled with ichorous fluid. Lung tissue studded with numerous white cancer nodules	No metastases anywhere throughout entire body	Large bronchial vegetations, fibrous stroma, mucous in some places; large alveoles and ramifying anastomosing cells, cuboid, cylindrical, and polyhedral. Structure of pulmonary nodules about the same	
No details	Mass of neoplasm at right hilus infiltrating and obstructing main lower bronchus. Entire lobe converted into cheesy, friable mass containing small cavities filled with pus and surrounded by necrotic tissue. Pneumonic hepatization at the periphery. Whole looks "like sponge filled with pus." Right vagus merged into neoplasm	No details	Cylindrical cells	Origin from bronchial epithelium
Bloody, no tubercle bacilli	Necrotic carcinoma of right bronchus perforating pulmonary artery; bronchiectatic cavities	Left pleura, bronchial and retroperitoneal lymph nodes; pancreas, spleen and kidneys	Alveolar structure, glandular cells surrounding lumen and secreting mucus	Origin from bronchial mucous glands
Dark, clotted blood	1000 c.c. of clear serum in right pleura. At root of right lung a whitish medullary mass surrounding but not compressing right bronchus and extending into the superior vena cava, obstructing its lumen. Similar medullary tumor in middle lobe. Cerebral ventricles distended with pus	None mentioned	Not given	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
200	MOORE, London Path. Soc. XXXII, p. 32 Cancer of Right Lung with Embolism in Middle Cerebral	F	56	R	Definite symptoms of pressure on right bronchus; enlarged and hard cervical lymph nodes. Aspiration yields bloody fluid. Diagnosed from this during life. Shortly before death aphasia and right hemiplegia
201	MORELLI, Deutsch. Med. Woch. 1907, May 16, p. 805 Ein Fall von primärem Lungenkrebs	F	28	Both	No heredity; always healthy. After cold with fever and cough, increasing loss of flesh and strength. Chill, severe pain in right chest, dyspnœa. Consolidation at right base with some pleural effusion. Endocarditis; dislocation of heart to right. Duration about 7 months
202	MORIGGIA, Rivista Clin. di Bologna, 1873, Serie 2, III, 5, p. 150 (Quoted after Meissner)	M	40	Both	Headache and increasing spasmodic cough. Nausea, depression, emaciation. After 3 months neuralgic pain in lumbar and hip regions. On admission to hospital signs of a chronic tubercular pneumonia. After 4 weeks delirium and intense thirst. Clinical diagnosis: tubercular meningitis. Death after 2 months
203	MÜLLER, HEINRICH, Diss. Freiburg, 1904 Zwei Fälle von primärem Lungencarcinom	F	68	R	For some months considerable emaciation, pain in right leg, foot, and back. Lungs, with the exception of slight emphysema, normal. Clinical diagnosis: sciatica, lumbago, and arteriosclerosis. Some time later hard gland above right clavicle. Still later, high fever, dulness, and bronchial breathing at right base. Sudden collapse. With appearance of gland, tumor of lung was suspected. Duration about 5 months
204	Loc. cit.	M	62	L	Enters hospital for psychiatric disturbance. Lungs normal at this time. Later increasing emaciation; rales at both bases. Tumor on left chest adherent to rib; glands in left axilla. Death in marasmus; duration of disease about 3 months
205	MÜSER, Mitteilungen aus den	M	53	L	General malaise, dyspnœa, cough, fever with chilliness, loss of weight,

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
No details	On surface of right lung hard white new growth in patches, penetrating into lung and continuous with similar dense tissue spreading into lung from root and pressing on main bronchus	Mediastinal, bronchial, and cervical lymph nodes	Bands of fibrous tissue with alveoli containing epithelium, in some parts distinctly columnar	
Bloody, shows diplococci	Both lungs studded with small white nodules corresponding to blood vessels, and connective tissue strands which macroscopically suggested fibrous results of pneumonic processes. Nothing pointing to tumor	Absolutely no others	Nests of epithelial cells in lymph spaces of fibrous tissue and adventitia of blood vessels, also epithelial clusters filling alveoles, in the alveolar septa and around blood vessels and smallest bronchi. Cells resemble glandular cells	Interesting features of this case are the youth of the patient involvement of both lungs and the fact that the diagnosis could only be made with the aid of the microscope
No details	Pleura, heart, pericardium normal. In lungs numerous larger and smaller nodules confluent and degenerated; small cavities in centre. Inner surface left frontal bone a soft whitish prominence. Meninges healthy. Numerous small nodules throughout brain	No others mentioned	Alveolar structure lined with cylindrical cells	
No details	Large tumor with softened and necrotic centre in right upper lobe. Right main bronchus infiltrated and obstructed by tumor. Upper lobes both lungs studded with small nodules. Some tuberculosis	Bronchial lymph nodes, ribs, kidneys, and adrenals	No details	Origin bronchial mucous glands
No details	Large tumor in left lung extending to pleura; no connection with bronchus. Tumor penetrates chest wall and extends under pectoralis. Gangrene of right lower lobe. At autopsy tumor is diagnosed as osteoma of rib	Only in brain	Typical carcinomatous alveolar structure; polygonal epithelium	Author designates alveoli as origin of tumor
Scant, mucopuru-	Large tumor left upper lobe containing cavity. Af-	Bronchial lymph	No details	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
	Hamburgischen Staats-Kranken-Anstalten, Vol. VIII, Heft 5, 1908 Über den primären Krebs der Lungen und Bronchien				severe headaches. Choked discs; various cerebral symptoms. Small area of dulness left upper lobe in front; otherwise both lungs normal. X-ray shows spherical shadow extending from left hilus. Duration about 18 months. Clinical diagnosis: tumor of left upper lobe with metastases in cerebellum. NOTE. — Case II of this author is not included as there is no autopsy and it is not certain whether tumor is primary in the lung
206	LOC. CIT.	F	51	R	Increasing dyspnœa, pressure, pain. Later enlarged supraclavicular glands. Manubrium œdœmatous and exceedingly tender to touch. Right lung from 2d rib down complete flatness and diminished respiration. X-rays show large shadow to right of sternum. Duration of disease about 3 years
207	LOC. CIT.	M	58	R	Cough, pain, loss of weight and strength. Various paralytic symptoms. Over middle lobe flatness and diminished respiration. Secondary tumor in liver. Diagnosis made during life. Duration about 3 months
208	LOC. CIT.	M	66	R	After influenza severe cough and bloody sputum. Rapid mental and physical decline. Later vertigo and paralysis. Œdœma of both lungs; clubbed fingers. Flatness right lower lobe; diminished voice and breathing sounds. On exploratory thoracotomy: a cavity filled with bloody pus and containing tumor particles consisting of polygonal and cuboid cells. At first some improvement; then rapid decline and death. Duration about 2 years
209	MÜSER, Loc. cit.	M	31	R	Two years before admission pain in right chest; for three months loss of weight, slight fever, cyanosis, dyspnœa, cough. Swollen lymph nodes in right axilla. Flatness right chest below 4th rib; diminished respiration in front; bronchial and amphoric breathing behind. Exploratory puncture shows characteristic granular cells from which diagnosis of tumor of right lung is made
210	LOC. CIT.	M	57	R	Pain, loss of weight and strength. Diminished respiration and slight area of flatness on right chest about 2d

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
lent, pathognomonic granular cells	ferent bronchus infiltrated with tumor and ulcerated	nodes and cerebellum		
Sputum contained characteristic cells				
At times bloody; characteristic granular cells	Large carcinoma of right middle lobe extending into lower lobe	Hilus and supraclavicular glands	No details	
Greenish, mucoid, fat droplets	Bloody serum in right pleura. Large tumor in middle and upper right lobes. Carcinomatous infiltration afferent bronchus	Bronchial and epigastric lymph nodes, liver, 5th rib, in number of vertebræ. Compression of spinal cord	No details	
Bloody, raspberry jelly, profuse hæmoptysis	Carcinoma of right lower bronchus, tumor cavity almost completely filling right lower lobe	Right lung and cerebellum	No details	
Bloody, characteristic granular cells			Carcinoma	*Operation:* Tumor of right lung containing cavity. As much of tumor as possible removed. Recovered and has remained well for a year
None	Large tumor near right hilus starting from bronchus	Liver and lymph nodes	No details	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
					to 3d rib. Otherwise both lungs normal. No cough. Death from sudden collapse. Duration about 2 months
211	Loc. cit.	M	59	L	Emphysema for years. Recently loss of weight and strength; cyanosis; dulness over left base with diminished respiration. Effusion in right pleura
212	Loc. cit.	M	72	L	Dyspnœa, cough, pain, rapid loss of weight. Left chest flattened, impaired respiratory motion; flatness, no breathing sounds. After aspiration 1050 c.c. brown serum, flatness remains
213	Loc. cit.	M	59	L	Sudden cough, expectoration, slight pain. Loss of flesh and strength. Dulness over left upper lobe with feeble breathing sounds and impaired respiratory motion. Duration about 10 months
214	Loc. cit.	M	65	L	Cough, rapid emaciation. Dulness over entire left upper lobe; diminished breathing, bronchial toward hilus. Duration about 2 months
215	Loc. cit.	M	44	L	Cough, expectoration, increasing loss of strength and weight. Flatness over all of left lobe; impaired respiratory motion; loss of breathing and voice sounds
216	Loc. cit.	M	58	L	Cough, expectoration, loss of weight and strength. Dulness over left upper lobe and sternum; a few large rales. Greatly diminished respiration. Duration about year and half
217	Loc. cit.	M	68	R	Cough, expectoration, loss of weight. Retraction right upper chest; flatness right upper lobe with diminished breathing sounds; no vocal fremitus. Emphysema and bronchitis in remainder of lungs
218	Loc. cit.	M	74	L	Cough, pain, loss of weight. Dulness over left lobe posteriorly with diminished voice and breathing

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
		which compress recurrent laryngeal and vagus		
No details	Carcinoma left lower lobe starting from main bronchus	Liver	No details	
Granular fatty cells	Left upper and lower bronchi infiltrated with tumor penetrating into lung and forming nodules	Both pleuræ, bronchial and tracheal lymph nodes	No details	
Mucoid, bloody; no assured granular cells	Ulcerated carcinoma of left main bronchus with tumor containing cavity in left upper lobe	Bronchial, tracheal, and mediastinal lymph nodes	No details	
No details	Large carcinoma starting from left main bronchus	Mediastinal lymph nodes compressing recurrent	No details	
Mucoid, often bloody, sometimes prune juice. No tubercle bacilli but granular cells	Carcinoma from left main bronchus involving nearly whole of left lower lobe. Embolus left pulmonary artery; aneurysmatic dilatation left ventricle	No details	No details	
Nothing characteristic	Large carcinoma from left main bronchus; bronchus left upper lobe completely closed by tumor	Bronchial and tracheal lymph nodes, liver and dura. *Pyloric carcinoma is also found*	No details	Author implies that pyloric carcinoma is distinct and independent of lung tumor. Microscopic structure unfortunately not given
Mucoid	Carcinoma at first bifurcation right main bronchus, almost completely obstructing right upper bronchus and proliferating along bronchial ramifications through upper lobe. Bloody serum in pleura	Pericardium, heart, kidneys, and suprarenals		
Bloody with characteristic	Carcinoma of left main bronchus involving nearly all of left lower lobe. Puru-	*Small carcinoma in stomach*	No details	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
219	MÜSER, Loc. cit.	M	59	L	Cough, pain, loss of weight. Impaired respiratory motion. Dulness and diminished voice and breathing over left lower lobe. Duration about 2 years
220	LOC. CIT.	M	67	R	Always healthy. Recently cough, dyspnœa. Dulness, diminished bronchial breathing, impaired respiratory motion over right upper lobe
221	MUSSELIER, Gaz. Méd. de Paris, 1886, 159 Cancer primitif du Poumon	F	75	R	No heredity; always well. Pain in right shoulder; later small hard tumor below right clavicle; subsequently similar tumor below left clavicle. Irregular area of dulness in right chest posteriorly with feeble respiration. Paraplegia. No cough; no dyspnœa. Duration about 7 months. Diagnosis made during life from the bloody sputum, pain and tumors below clavicle
222	MUSSER, J. H. Univ. Penna. Med. Bull. Vol. XVI, Oct. 1903, No. 8, p. 289 Primary Cancer of Lung	M	49	R	No heredity. Clinical symptoms those of pleuropneumonic infection. Slight fever, physical signs of effusion; aspiration negative. Exploration revealed nodule in lung. Marked leucocytosis. Cachexia very late. Duration less than 3 months
223	LOC. CIT.	M	47	Both	No heredity. Sore throat only at night and in recumbent position. Indigestion, dyspnœa, loss of flesh and strength. Moderate cough causes bringing up of large amount of fluid. Slight pleural friction in right axillary region only physical sign on lungs. Nothing characteristic in blood. Signs of bronchitis and pleuritis; rales at both bases. Intense dyspnœa; increased leucocytosis. Duration about 5 months
224	MAUN, I. Deutsch. med. Zeit. XXVI, 1905, p. 537 Ein Fall von primärer Krebsentwickelung in den Bronchien	M	50	L	Lues 20 years ago. Recently loss of weight and strength; repeated hæmorrhages. Persistent pain without swelling in all joints. Near left costoclavicular articulation a tumor size of a walnut, hardly movable, slightly fluctuating. Dulness over both supraspinous fossæ; dulness left base with diminished respiration.

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
fatty granular cells	lent exudate in left pleural cavity			
Bloody, fatty granular cells	Nearly whole of left lower lobe converted into hard cancerous mass. Bloody fluid in left pleura	No details	No details	
Purulent, bloody with "Fett-körnchen"	Carcinoma of right upper bronchus; obliteration of pleura. Bronchiectasis and bronchopneumonic areas in both lower lobes	Bronchial lymph nodes and liver	No details	
Currant jelly	Several larger and smaller tumors softened in centre in upper portion right lower lobe	No others	No details	
No details	Massive tumor of right lower lobe	Left lung, liver, thoracic lymph nodes	No details	A second case is not included because there was no autopsy but there is no doubt that it was a similar case
Not bloody, no tubercle bacilli	Diffuse yellowish gray infiltration uniformly throughout both lungs. No pleuritic effusion	Cervical, bronchial, tracheal, and retroperitoneal lymph nodes	General alveolar appearance of lung retained; frequent areas of necrosis. Flat epithelial cells resembling alveolar epithelium; in older portion distinctly papillary arrangement and cylindrical cells	No anatomical cause for the orthopnœa and sore throat could be found. Clinical diagnosis was tuberculosis
Abundant, mucopurulent; no tuberclebacilli; repeated hæmoptyses; later	Left lung adherent; near posterior border large cavity; numerous bronchiectatic cavities containing pus. Right lung normal. A mass the size of an orange at bifurcation of main bronchus; similar tumor at lower end of trachea toward left. Near	Areas of neoplasm in pericardium and left ventricle	Abundant firm stroma; alveolar structure filled with polymorphous epithelial cells; plentiful	Practically no pain, no dyspnœa, and nothing characteristic. Only significant symptoms initial hæmoptysis and rapidly increasing cachexia

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
					Cough. Pain left base. Aspiration. clear blood. Diarrhœa. No fever: Hæmoglobin 40, leucocytes 15,000. Death from exhaustion. Duration about one year. First diagnosis was tuberculosis, then pneumonia with bronchiectasis. Only very late during life was there a suspicion of malignancy
225	NEUMEISTER, Münch. med. Wochenschr. No. 36, 52, 1905, p. 1721 Ein Fall von primärem Plattenepithelkarzinom der Lunge, etc.	M	63	L	Had pleurisy some years ago. Weak, cachectic; suffered for year with pain in right shoulder joint. Clinical diagnosis: pulmonary tuberculosis and tuberculosis of right shoulder joint
226	OBERTHÜR, Revue Neurol. Vol. X, Paris, 1902, p. 485	F	32	L	No heredity. At age of 27 both ovaries removed for cystic degeneration. About middle of 1899 she complained of vague pain along spine, in shoulder and chest even on slightest effort. Loss of appetite and flesh. End of year, frequent painful attacks, cough, bloody sputum. Diagnosis at that time tuberculosis. Patient then commenced to drink large quantities alcoholic liquors. Increasing dyspnœa, œdœma of lower extremities. Nervous symptoms now predominate, painful cramps in both upper and lower extremities and along spine which prevent sleep. Rapid atrophy of muscles. Soon not only walking but almost every movement becomes impossible; intense general hyperæsthesia. Details of neurological examination omitted. Continuous dyspnœa; absolute flatness over whole of left lung. Total absence of breathing except some amphoric respiration at hilus. Dulness at base of right lung with friction; harsh breathing throughout and some rales. Continuous sweating. Clinical diagnosis: alcoholic polyneuritis and pulmonary tuberculosis
227	OESTREICH, Berl. klin. Wochenschrift, 1892, p. 104, Demonstration	F	62	R	Malaise for some time. Effusion of clear serum in right pleura. Increasing dyspnœa, cyanosis, œdœma of upper body

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
bloody	origin of left main bronchus a ¾ cm. whitish yellow mass destroying the cartilages and penetrating into lumen of bronchus		karyokinesis. Origin from bronchial mucous membrane	
No details	Anatomical diagnosis: tuberculosis of left lung; broncho-pneumonia of right; purulent bronchitis; cheesy degeneration of right suprarenal, tubercular arthritis right shoulder joint	Only in right shoulder joint	Capsule of joint showed no tuberculosis but infiltration with typical cancroid pearls. In the lung innumerable foci of carcinoma of cancroid type which could not be differentiated from the tubercular tissue which was everywhere intermingled	
Abundant, mucopurulent, often streaked with blood, but no "currant jelly." Sputum not examined microscopically	Large quantity yellow serous fluid in left pleura; small quantity in right. Cancerous pleurisy; cancerous lymphangitis. Left lung retracted, atelectatic, and fibrous at apex. Whole left lower lobe and hilus a massive cancer, soft in interior and fibrous exteriorly. Large and medium size bronchi disappear entirely in tumor. Small secondary nodules especially near hilus in right lung around bronchi. Swollen mediastinal lymph nodes envelop base of trachea and main bronchi. Pericardium and myocardium contain miliary nodules; innumerable miliary nodules in skin and muscles all over body	2 secondary nodules in uterus; miliary nodules in both kidneys, suprarenals, pancreas, liver, retroperitoneal glands, pericardium, myocardium, skin, and muscles	Glandular epithelium with cylindrical cells with many karyokinetic figures	Discussion whether primary in lung. Probable origin bronchial mucous glands. Microscopic study of nerves and muscles, also miliary nodules, all show same character as primary tumor. Nothing in brain, medulla or meninges. Lesions in nervous system and muscles by their pressure cause degeneration of nerve and muscle fibres with pseudo-hypertrophy in the latter
No details	Carcinoma of right main bronchus involving lung along bronchial ramifications; some obstruction of	No details	No details	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
228	OTTEN, Fortschritte auf dem Gebiete der Roentgenstrahlen, Vol. IX, Heft 6, 1906, p. 369 Zur Roentgen-diagnostik der primären Lungencarcinome	M	69	R	Pain in right chest, cachexia, œdœma of right arm; dilated veins over right chest and belly. Dulness and absence of breathing over right upper lobe. Some dyspnœa; no cough
229	Loc. cit.	M	67	R	No heredity. Cough and expectoration for years; otherwise well. Diagnosis at first, tuberculosis. Later pain in right shoulder, cough, dyspnœa, cyanosis of upper body. Enormous dilatation of superficial veins; œdœma of arm. Cachexia. Dulness right upper lobe with signs of cavity. No fever
230	Loc. cit.	M	60	R	Father died of carcinoma of stomach. For 4 months pain in right chest, cough, expectoration; general debility. Enlarged axillary glands. Dulness right upper and middle lobes. Duration of disease about 5 months
231	OTTEN, Loc. cit.	M	61	L	Cough and mucoid expectoration for several years. Increasing dyspnœa, emaciation, and debility. Enlarged glands in both axillæ. Dulness over nearly entire left lung. Some fever. Death after about 5 months
232	Loc. cit.	F	65	R	Mother carcinoma of uterus. Always well. For 6 weeks increasing weakness, loss of flesh, dyspnœa, cough, pain in chest and back; attacks of suffocation; some fever. Dulness right middle and lower lobes. Impaired respiratory motion. Hæmorrhagic effusion in right pleura
233	Loc. cit.	M	66	R	No heredity; always well. For about 5½ months bloody expectoration, loss of weight, cough, cyanosis, dyspnœa; moderate fever. Enlarged axillary and clavicular glands on right side. Hoarseness. Consolidation of right upper lobe
234	Loc. cit.	M	45	L	No heredity. For 5 months cough, dyspnœa, increasing debility, and loss of weight. Signs of consolidation of right upper lobe with dry pleurisy in right chest. Bloody effusion in left chest. Paresis of left recurrent
235	Loc. cit.	M	62	L	No heredity. For several months increasing weakness and loss of flesh.

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
	left bronchus. Extensive gangrene of lung; bronchiectasis. Compression of upper cava, aorta and œsophagus			
None	Carcinoma of right upper lobe. Thrombosis right subclavian and axillary veins	Glands of hilus and right axilla	No details	
Mucopurulent	Carcinoma of right upper lobe with cavity in centre. Thrombosis upper cava and both internal jugulars	Lymph nodes at root	No details	
No details	Carcinoma of right main bronchus and infiltration of upper and middle lobes	Bronchial lymph nodes and liver	No details	
Mucoid	Carcinoma of entire left lung	Liver, hilus, and axillary lymph nodes	No details	
Purulent	Carcinoma of large bronchus of right side with infiltration of entire middle lobe	Liver, right adrenal	No details	
Bloody	Carcinoma of right bronchus infiltrating upper and middle lobes	Axillary and clavicular glands	No details	
Mucoid	Carcinoma of left main bronchus infiltrating a large part of left upper lobe. Pneumonia of right lower lobe	Glands of left hilus	No details	
No details	Carcinoma of left main bronchus infiltrating large	Bronchial, tracheal,	No details	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
					Cough, pain in left chest, dyspnœa, and cyanosis. Enlarged left axillary and clavicular glands. Dilated veins left shoulder. Dulness over left upper lobe. Absence of breathing over all of left chest. Paralysis left recurrent
236	Loc. cit.	M	49	L	No heredity. For about 2 months cough, expectoration; later dyspnœa and palpitation. Hoarseness, cyanosis, paralysis of left recurrent. Infiltration of left upper lobe
237	Loc. cit.	M	53	L	No heredity. For about 6 months increasing debility, loss of flesh, stomach trouble. During last few weeks fever, headaches, dizziness. Cachexia, choked discs, ataxia. Small area of dulness to left of manubrium sterni
238	Loc. cit.	F	Not stated	R	No heredity. For 2 years varying symptoms. Dyspnœa, cough, some pain in chest. No fever. Small dull area to right of sternum gradually extending over greater portion of right chest
239	Loc. cit.	M	57	R	No heredity. For 6 months cough with expectoration, loss of strength and weight, increasing dyspnœa. Slight fever; physical signs of profuse bronchitis over both lungs. Enlarged glands in right supraclavicular fossa
240	Loc. cit.	M	51	L	Father probably died of cancer. For 3 months pain in left chest. Cough, increasing loss of flesh and strength, slight fever. Dulness over left lower lobe. Attempt was made to remove left lower lobe by operation. Increasing cachexia; steady fever. General carcinosis of left pleura
241	Paessler, Virchows Arch. Vol. 145, 1896, p. 191 Über das primäre Karzinom der Lunge	M	73	L	Well until 6 weeks before death; then slight cough, scant sputum, paralysis of left recurrent. Pneumonia of left lower lobe. Clinical diagnosis: aneurism or mediastinal tumor
242	Loc. cit.	M	52	R	Always well. Little cough, no pain, some persistent hoarseness. Without premonition 2 sudden and profuse hæmoptyses causing death in 2 days Clinical diagnosis: pulmonary phthisis

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
	area of upper lobe. Sero-sanguinolent effusion in left pleura	axillary, and clavicular lymph nodes		
Scant, mucoid	Carcinoma of left main bronchus	Both lower lobes	No details	
Purulent	Carcinoma of main bronchus of left upper lobe infiltrating nearly all of upper lobe	Bronchial lymph nodes and cerebellum	No details	
Often bloody, profuse	Bronchial carcinoma infiltrating right middle lobe	Both lungs	No details	
Mucopurulent, later bloody	Carcinoma of right large bronchus infiltrating middle and part of upper lobe. Numerous bronchial and peribronchial nodules throughout other lobes	Lung, bronchial, and supraclavicular glands	No details	
Bloody	Left lower lobe almost entirely removed; remnant cancerous. Carcinosis of left pleura; carcinomatous pericarditis. Old tuberculosis right apex	Pleura, pericardium, heart, left kidney, left adrenal	No details	
Scant, never bloody	Ulcerated medullary carcinoma of left main bronchus. Compression of trachea; numerous bronchiectatic cavities in left upper lobe. Aspiration pneumonia of left lower lobe. Hæmorrhagic effusion in left chest. Compression of left recurrent	Lymph nodes at root of left lung	Cylindrical celled carcinoma	
None	Carcinomatous ulceration of right main bronchus. Erosion of branch of right pulmonary artery. Cancerous infiltration in walls of large vessels and nerves, proliferates through pulmonary vein into left auricle and into pericardium	Large vessels and nerves, left auricle and pericardium	Horny pavement celled cancer	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
243	Loc. cit.	M	63	L	Apoplexy with paresis of right facial, hypoglossal, arm, and leg. Cachexia. Respiration normal but diffuse dry rales with some pleuritic friction. Clinical diagnosis: general paresis. Duration about 5 months
244	Loc. cit.	F	46	L	No heredity. Syphilitic symptoms for many years. For a few days pain in left chest, cough, and dyspnœa. Flatness with feeble inspiration and absence of vocal fremitus on left chest. Intense dyspnœa and cyanosis. Aspiration: clear serum; sudden death at end of aspiration. Clinical diagnosis: pleurisy and lues
245	Papinio, Pennato, Riv. Ven. di Scienza Med. Anno X, Tomo XIX, p. 393, Nov. 1893 Carcinoma primitivo del Polmone	F	12	R	Ill 6 months before admission with pain in right chest, sweats, attacks of cough without expectoration; prostration. On admission pale, emaciated child, right chest larger than left; impaired respiratory motion of right side. Upper right intercostal spaces obliterated. Enlarged gland in right axilla. Absolute dulness over whole anterior of right chest, also laterally and posteriorly except for a small space along spine at apex which gave a little resonance. Heart displaced toward left; nothing essential in left lung. No fever. 150 c.c. blood from pleural cavity. Second exploratory puncture only a few drops of blood. Dyspnœa; cyanosis. Death after 3 weeks in hospital
246	Parow, Diss. Greifswald, 1896 Ein Fall von primärem Lungencarcinom	M	62	R	No heredity. Indefinite symptoms for some time. Later dyspnœa, cachexia, dysphagia. Tumor in right supraclavicular region
247	Passow, Diss. Berlin, 1893 (After Paessler) Zur Differentialdiagnose der Lungentumoren insbesondere der primären Lungenkrebse	M	51	R	No clinical details
248	Peacock, London Path. Soc. IV, 1849–50 Primary Cancer of the Lung	F	43	L	Pain in chest, difficult breathing, cough, cachexia. Complete dulness over upper left chest, feeble inspiration and prolonged expiration suggesting compression of bronchus. Later intense dyspnœa, cyanosis, swelling of face, neck, chest, and arms. Swelling of glands on each side of neck. Entire left lung impervious to air. Duration of illness about 10 weeks

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
No details	Carcinoma of main bronchus of left lower lobe	Lower lobe right lung, liver, and many in brain	Cylindrical celled carcinoma	
No details	Almost complete compression of left lung; subpleural carcinoma of left upper lobe	Miliary cancer nodules in pleura and middle and upper right lobes. No other metastases	Cylindrical celled carcinoma	
None	Nearly entire right chest occupied by spheroid mass, soft and semi-fluctuating. Upper lobe of lung pressed upward and backward. Two lower lobes replaced by neoplasm. All other organs normal	None except gland in right axilla	Probably carcinoma	
No details	Carcinoma right main bronchus and beginning of left. Bronchiectases and atelectases right upper lobe. Large nodule compresses œsophagus	Cervical and supraclavicular lymph nodes	Cylindrical and polymorphous epithelial cells	Author mentions as origin surface epithelium of bronchi
No details	Carcinoma involving bronchi and lung and penetrating anterior wall of chest	Mediastinum and supraclavicular lymph nodes	Cylindrical cells	
None	Tumor right upper sternum and external end left clavicle in connection with masses of carcinoma imbedded in upper part left lung and extending along bronchus to bifurcation and down posterior mediastinum. In lung, divisions of bronchus almost obliterated; branches of pulmonary ar-	No further details	No details	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
249	PEARSON, CHAS. L. Charlotte Med. Jour. XV, 1899, p. 633 Case of Encephaloid Carcinoma of Lung with Tuberculosis	M	41	L	Grandmother and 2 aunts died of cancer. Commenced with pain in left side. Aspiration: clear serum. Patient worked for 3 weeks, then pain, cough, fever, and night sweats. Dulness over left chest. Dulness anteriorly to nipple; bronchial respiration over apex; absence of breathing over rest of lung. Heart displaced to right. Good appetite. Dry cough. Aspiration negative. Dysphagia later; hæmoptysis. Malignancy suspected. Duration about 5 months
250	PENSUTI, V. Lavori dei Cong. di Med. Intern. Nono Cong. Ten. in Torino, nell' Ottobre 1898 (Roma, 1899), p. 338	M	52	R	Always well. Sick since 7 months before admission when lipoma size of hen's egg was removed from posterior right chest. Tumor not examined microscopically. Three weeks after admission anterior right chest showed impaired respiratory motion and a zone of dulness with bronchial respiration from 2d to 5th rib and from axilla to margin of sternum. Diagnosis of cancer of lung was made. Patient lost sight of for 4 months, then great marasmus, paralysis of right vocal cord, pleuritic pain in right side; no fever. Dulness extended to posterior and lateral wall of thorax. Dyspnœa
251	PEPERE, Centralbl. f. Path. Anat. Vol. XV, 1904, p. 948	F	57	R	No clinical history
252	PERITZ, Diss. Berlin, 1896 Über Brusthöhlen geschwülste	M	48	R	Commenced with chill, pain in right chest, cough, dyspnœa, general cachexia. Dulness increasing to flatness over entire right chest. Diminished breathing and fremitus; stridorous respiration. Paralysis of recurrent. Appearance of tumor above sternum. Enlarged axillary and cervical glands. Right radial pulse smaller than left. Duration of disease about 5 months

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
	tery flattened and compressed; pulmonary vein obliterated. Tumor enclosed and compressed upon lower trachea and aorta and protruded into cavity of pericardium. Left innominate vein obliterated			
Prune juice sputum, many tubercle bacilli; pieces of necrosed lung tissue coughed up with hæmorrhage	Left lung solid with nodulated tumor containing cavity	Right lung	Encephaloid carcinoma. Tubercle bacilli in cavity	
Always "currant jelly." No tubercle bacilli, but on first admission showed numerous large flat polymorphous cells from which diagnosis was made	Right lung almost entirely transformed into hard mass. Left lung normal	Glands at hilus, liver, kidney, mesenteric glands	Alveolar structure; many large polymorphous epithelial cells similar to those found in sputum. Pleura free	At the autopsy no connection could be traced between scar from lipoma incision and tumor of the lung
No details	Bloody effusion in right pleura. Right lung normal in shape but ⅓ normal size, grayish and yellowish white throughout; interstitial tissue much thickened. Bronchi normal	Left lung, brain, lymph nodes at hilus	Typical cylindrical celled carcinoma. Probable origin from smallest bronchioles and alveoles	Diagnosis only possible by microscope without which the case would have been diagnosed as chronic interstitial pneumonia with acute fibrinous pneumonia in the stage of gray hepatization
Occasionally bloody, no tubercle bacilli or tumor elements	Primary carcinoma of right main bronchus penetrating lung without sharp definition. Bronchiectatic cavities	Mediastinal, mesenteric, axillary, cervical lymph nodes and liver	Alveolar structure; 2 to 3 layers of smooth cylindrical cells	Supposed origin: ducts of bronchial mucous glands

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
253	Loc. cit.	M	47	R	Sudden onset with bronchitis, œdœma of face, increasing dyspnœa, cyanosis, dilatation of veins, pain in arms and chest. At the beginning nothing essential found in lungs, but absolute flatness over sternum extending to both sides. Feeble respiration over all of right chest. Later effusion in right chest. Heart dislocated to left. Aspiration: clear serum. Duration about 4 months
254	Loc. cit.	M	64	L	Dyspnœa, pain in left chest, back, and arm. Bulging of left chest, impaired respiratory motion. Flatness and varying areas of dulness over left chest. Some fever. Aspiration: turbid serum. Later distinct pulsation and increased fremitus over anterior left chest. Improvement; patient gets about. Gradual retraction of left chest; dulness again appears; increasing cachexia. Duration about 10 months
255	Loc. cit.	M	36	L	No previous illness. Sudden fever, pain, cough, expectoration. Some improvement, then fever and symptoms of left pleurisy with effusion. Heart dislocated to right. Aspiration: 500 c.c. bloody serum; needle penetrating into hard tissue. Later chills; flattening and afterward bulging of left chest. Enlargement of supraclavicular glands. Aspiration: pus. Resection of rib
256	Perls, Virchows Arch. Vol. 56, p. 437 Zur Casuistik des Lungencarcinoms	M	43	R	Pain, anorexia, chilliness, fever, dyspnœa, cough. Expansion right chest; dulness, feeble respiration above, absence of breathing sounds below; no fremitus. Liver displaced downward. Duration about 3 months
257	Perrone, A. Arbeiten aus dem Path. Instit. in Berlin, 1906 Entwickelung eines primären Cancroids von der Wand einer tuberculösen Lungencaverne	M	74	L	No previous illness. Commenced with pain in left shoulder; disappeared but returned very severely. Bulging, impaired respiratory motion. Dulness, diminished breathing and crackling rales over left chest. Tumor above left clavicle. General cachexia. Duration about one year
258	Perutz, Diss. München, 1897 Zur Histogenese des primären Lungencarcinoms	M	58	R	No clinical history

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
Occasionally bloody, neither tubercle bacilli nor tumor particles	Bloody fluid in right pleura. Tumor nodules in mucous membrane of right main bronchus connecting with large masses surrounding trachea and extending into right chest, penetrating lung and compressing it. Upper cava compressed	No others	Alveolar structure; small cylindrical cells	Supposed origin from bronchus
Mucoid, no tubercle bacilli; no blood	Large firm tumor at left hilus; polypoid tumor masses obstructing left main bronchus. Tumor penetrates lung along bronchial ramifications	Lymph nodes and liver	Pavement epithelium with typical cancer nests	
Mostly bloody	Encapsulated empyema. Carcinoma of left lung and bronchi. Carcinomatous infiltration of pleura	Muscles of chest, liver, kidneys, capsule of spleen	Alveolar structure; pavement epithelial cells	
Bloody	Bloody serum in right pleura. Right main bronchus and branches infiltrated and obstructed by tumor. Cavities with thick capsules in upper and lower right lobes	Posterior mediastinal lymph nodes, liver, ribs, intercostal muscles, brain	Alveolar structure; cancer nests	
No tubercle bacilli	Tubercular cavity at left apex; wall of cavity penetrated by tumor involving 1st and 2d ribs, and 6th and 7th cervical and 1st dorsal vertebræ. Compression of axillary nerves and vessels	No others	Tubercular tissue with bacilli in wall of cavity besides typical cancer pearls. Bronchi intact	
No details	Cavity in right upper lobe, walls of which are formed by firm white tumor. Tumor extends to right main bronchus, wall of which is perforated, one of the perforations communicating with cavity. Tumor penetrates into upper cava	No other details	Alveolar structure; cylindrical and cuboid cells with formation of mucus. Origin bronchial mucous glands	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
259	Loc. cit.	M	50	L	No clinical history
260	Loc. cit.	F	48	L	Diagnosis made during life from expectorated tumor particles
261	Pitini & Mercadante, La Reforma Med. Roma, Vol. III, 1902, p. 710 Carcinoma midollare primitivo del polmone	F	37	R	Syphilis admitted. On admission cyanosis of face, œdœma of right arm, forearm, and hand. For about 6 months harassing dry cough, and pain in right shoulder. Later cough becomes moist. Increasing dyspnœa, irregular dulness over greater part of right chest from above downward; diminished fremitus; bronchial respiration; many rales. All other organs healthy. No leucocytosis; red cells 3,500,000. Later swelling of right thorax and arm, dulness and absence of voice all over; diminished breathing. Still later all signs of effusion in pleura. Diagnosis of solid tumor of lung was made. Under observation 21 days
262	Pitt, London Path. Trans. 39, p. 54 (After Paessler) Malignant Disease of Bronchial Glands	F	67	R	No clinical history
263	Puech, Montpellier Méd. 2 me Série, XI, 1888, July, p. 6 Cancer de la Trachée et Tuberculose pulmonaire	M	67	R	No heredity. Disease commenced with severe bronchitis, general weakness, fever, diarrhœa. Tubercular cavity right apex. Duration about 9 months
264	Reinhardt, Arch. der Heilk. 19, 1878, p. 369 Primärer Lungenkrebs	M	47	R	Œdœma of upper half of body. Hoarseness, dyspnœa, dysphagia. Dilated veins on posterior and anterior surface of chest. Dulness over right upper lobe; diminished breathing anteriorly; bronchial behind. No rales. Effusion in right chest. Little cough; some fever. Erysipelas of chest. Death. Duration about 5 weeks

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
No details	Left upper lobe almost entirely replaced by large nodulated tumor protruding into mediastinum. In centre of tumor a cavity into which bronchus of upper left lobe opens. Left upper bronchus infiltrated with tumor nodules	Regionary lymph nodes and wall of left ventricle	Alveolar structure; polymorphous epithelial cells; tumor injection of lymph vessels	
Tumor particles	Left main bronchus infiltrated with tumor; lung studded with small tumor nodules; larger tumor at apex left lower lobe	Bronchial and tracheal lymph nodes; both kidneys brain	Carcinomatous structure	
Abundant, mucopurulent. Nothing characteristic	Abundant serous effusion in pleuræ and pericardium. Left lung studded with larger and smaller tumor nodules. Upper part right lung firmly adherent to chest wall; numerous smaller nodules throughout lung, but upper lobe one large mass of tumor	Left lung, axillary, peribronchial lymph nodes. Right subclavian compressed. All other organs normal	Typical epithelioma. Massive new formation of fibrous tissue; mucoid and colloid degeneration within the new formed tumor masses. Carcinomatous structure in secondary lymph nodes. Lung tissue completely replaced by tumor. Origin attributed to alveolar epithelium	Nearly all the usual symptoms of pulmonary carcinoma absent — no characteristic bloody sputum, no hæmorrhagic exudate in pleura; no cachexia
No details	Carcinoma of right main bronchus considerably obstructing lumen	No details	No details	
Profuse hæmoptysis	Left lung normal. Tubercular cavities right lung. White tumor in trachea near bifurcation, extending into right main bronchus and partially obstructing it	Peribronchial lymph nodes	Alveolar structure; flat epithelial cells	Tumor evidently gave no recognizable clinical symptoms
None	Wall of right bronchus penetrated by tumor starting from hilus. Infiltration of upper lobe along bronchial ramifications. Compression of upper cava	Lymph nodes at bifurcation	No details	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
265	REINHARDT, Sections Protocoll des Dresdener Stadtkrankenhauses, 1885, No. 83	F	66	L	No clinical history
266	LOC. CIT. 1858, 232	M	62	L	No clinical history
267	LOC. CIT. 1861, 108	F	40	R	No clinical history
268	LOC. CIT. 1872, 433	F	67	L	No clinical history
269	LOC. CIT. 1873, 260	F	62	L	No clinical history
270	LOC. CIT.	M	40	L	Increasing debility, cough, pains in left chest. Dulness and feeble breathing over lower left chest; tympanitic percussion note over upper portion. Duration of disease about 5 months
271	LOC. CIT.	M	74	R	Cough, dyspnœa, pain in back, vertigo, anorexia, and weakness. Bulging of lower right thorax with dulness and diminished voice and breathing. Above this area tympanitic percussion note and bronchial breathing. Dislocation of heart and liver
272	RIPLEY, New York Med. Record, XVIII, 1880, 691 Primary Infiltrating Medullary Carcinoma of Lung	M	58	L	No heredity. Always well. Commenced with slight cough, pain in sternal region, weakness, and dyspnœa. Dulness from left clavicle downward with loss of fremitus and distant bronchial breathing. Exploratory puncture: small quantity bloody serum without relief of dyspnœa. Duration about 4 months
273	RISPAL, Toulouse Méd. Vol. II, p. 305 (1900) Cancer primitif du Poumon	M	55	R	No heredity. Bronchitis since infancy; cough and expectoration always. For 3 months severe pain in right chest; anorexia, cachexia. Dulness at right base with diminished vesicular murmur. Only other symp-

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
No details	Large tumor in left lower lobe, softened in centre. Obstruction of main bronchus	Brain	No details	
No details	Tumor of left hilus. Bronchiectatic cavity lower lobe; also nodule in left lower lobe	No details	No details	
No details	Bloody fluid in right pleura. Large round tumor in middle lobe involving upper and lower lobes. Bronchi run freely through tumor; rest of lung compressed. Tumor extends to heart and compresses upper cava and pulmonary vein	No details	No details	
No details	Large cavity in left lower lobe surrounded by wall of tumor with papillary excrescences proliferating into interior of cavity	No details	No details	
No details	Primary carcinoma of main bronchus of left lower lobe. Carcinomatous infiltration of the lobe. Effusion in left pleura	No details	No details	
Mucoid	Solid tumor at hilus of left lung occluding bronchus and compressing large vessels	Bronchial and tracheal lymph nodes	No details	
Purulent and bloody, one hæmoptysis	Entire right lower lobe converted into a large sac filled with pus and communicating with main bronchus. Walls of the sac consist of tumor. Walls of bronchus infiltrated with tumor and obstructed	Liver, peritoneum, tracheal lymph nodes	No details	
Mucous	Bloody serum in left pleura. Almost entire left lung solidified. Right lung also infiltrated	Bronchial lymph nodes. Both kidneys	Medullary carcinoma	
Abundant, yellowish purulent	Large tumor in lower lobe. Softened in spots. Chalky tubercles in left lung	Pleura, heart, peribronchial, tracheal, and mediastinal	Thick, fibrous matrix bounding cavities filled with epithelioid cells,	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
					toms digestive disturbances, constipation, and polyuria
274	ROSENTHAL, ... Diss. München, 1899 Über einen Fall von primärem Lungencarcinom	F	52	L	No heredity. Gradual hemiplegia of right side with aphasia, convulsions, and other cerebral symptoms. Later some dyspnœa. Nothing found on lungs. Later bronchitis with fever and cough; symptoms of vocal paralysis. Duration about 6 months. Entire clinical picture dominated by cerebral symptoms; no lung symptoms except cough and dyspnœa
275	ROTHMAN, C. Deutsch. Med. Wochenschr. 1893, No. 35, p. 844 Primäres Lungencarcinom (Demonstration)	M	56	R	Slight hæmoptysis at 17. A year before admission bloody expectoration, but nothing could be found in heart or lungs. Good appetite; gained weight. Later dyspnœa, œdœma of face and right arm, dilated veins of chest. Dulness and diminished respiration over right apex. Hæmorrhages almost without interruption for $\frac{3}{4}$ of year. Sudden death from œdœma of glottis. Probable tumor diagnosed during life. Duration of disease a little more than a year
276	ROTTMANN, Diss. Würzburg, 1898 Über primäres Lungencarcinom	M	35	L	No heredity. Pain, dulness, diminished breathing and voice sounds. Exploratory puncture negative. Sudden paralysis of both lower extremities. Fever, dyspnœa, death in collapse
277	LOC. CIT.	M	57	L	Cough, anorexia, emaciation. *Physical examination of lungs practically negative*
278	ROWAN, JOHN, Transact. Ophthal. Soc. of United Kingdom, Vol. XIX, 1899, p. 103	M	55	R	Pulmonary affection for 4 months before admission. Initial hæmoptysis; cough. Impaired respiratory motion of right chest. Dulness behind to 6th dorsal vertebra; diminished breathing.

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
		lymph nodes	mainly polyhedral; many necrotic or undergoing fatty degeneration. Peripheral zone of tumor shows alveolar stroma infiltrated with small round cells; alveolar spaces contain polymorphous cells	
Mucoid	Carcinoma of left main bronchus perforating wall and extending into left lung. Compression and thrombosis of right pulmonary artery	Brain, bronchial, and tracheal lymph nodes, wall of left ventricle of heart	Alveolar structure well developed stroma; typical cylindrical cells with some degeneration in centres of cell nests	Origin from epitheleum of bronchial mucous membrane
Bloody, no tubercle bacilli; profuse hæmoptysis for almost ¾ year	Infiltrating carcinoma of right upper lobe	Pericardium	No details	
Occasionally bloody	A large tumor and connected with it a smaller one in left lung. Large tumor contains cavity filled with tumor material and pus. Tumor proliferation into pulmonary vein and left auricle	Bronchial lymph nodes and bodies of 7th and 8th vertebræ, compressing cord	Transition from cylindrical to pavement epithelium can be demonstrated	Origin probably from bronchial mucous glands
Purulent	Emphysema and purulent bronchitis. Large tumor in left lower lobe and another between upper and lower lobes	Right lung	Pavement and polymorphous epithelium and abundant elastic fibres in stroma	
Bloody, no tubercle bacilli. Many fatty	Left lung normal. Peculiar fibrous induration along bronchi of right lung extending through to left lower lobe and adherent to peri-	Bronchial glands and left eye. No other metastases	Irregular cells arranged somewhat in form of glandular acini	Author believes origin to be from glandular or mucous structure of bronchi

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
	Metastatic Carcinoma of the Choroid from a Primary Carcinoma of the Lung				Dull tympanitic sound all over right chest in front. *No dyspnœa.* Cervical glands enlarged over both clavicles. *No pain.* No history of lues. Details of examination of left eye are given. Diagnosis of malignant disease of the lung made during life. Sudden death about 3 weeks after admission. Duration of disease about 5 months
279	Rubenstein, Wratsch. 1898, No. 22. Centralbl. f. path. Anat. Vol. X, 1899, p. 240 Zur Frage über die Histogenese des primären Lungenkrebses	M	61	L	No clinical history
280	Sabolotnow, Gesellschaft der Aerzte an der Universität. Kasan. Die Med. Woche, Berlin, 1902, p. 457 Ein Fall von primärem Lungencarcinom	M	63	L	No clinical history except statement that there was arteriosclerosis and paralysis of recurrent laryngeal and that diagnosis of carcinoma of left upper lobe was made during life
281	Sadowski, Centralbl. f. Grenz-	M	40	R	Attack of pleurisy with recovery. Second attack after 5 months. Aspi-

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
granular cells. Hæmoptysis	cardium. Bronchi considerably narrowed		Cancer infiltrates mucous membrane of bronchi and surrounding lung tissue	
No details	Carcinoma of left hilus	No details	Alveolar structure; cuboid, pavement, and cylindrical cells; pearls also found	Author considers tumor of alveolar origin
No details	Left pleura closely adherent. Both upper and lower left lobes uniformly enlarged and lung tissue replaced by small soft white nodules, confluent or separated by fibrous tissue	Bronchial glands	Very thick fibrous stroma surrounding small cavities of the size of pulmonary alveoles. These are filled with cuboid, cylindrical and polygonal epithelioid cells. The cells are arranged in a somewhat papillary form over strands of fibrous tissue	Author believes alveolar epithelium to be origin of tumor
None	Carcinoma of right bronchus with abscesses in right lung	None mentioned	Carcinoma keratodes	
None	Entire upper lobe of right lung converted into a block of grayish lardaceous tissue without a trace of pulmonary structure. All other organs entirely normal, even those of mediastinum. The parotid tumor is only a mass of hypertrophied glands	Parotid glands	Simply stated: tumor was epithelioma of lung	
No details	Large tumor starting from root of left lung proliferating into lung tissue along bronchial ramifications	Bronchial lymph nodes and *myoma of uterus*	Alveolar structure; irregular polymorphous epithelial cells	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
284	SCHLERETH, Diss. Kiel, 1888 (After Pässler) Zwei Fälle von primärem Lungenkrebs	M	55	Uncertain	No clinical history
285	LOC. CIT.	Not	stated	R	No clinical history
286	SCHMIDT, Diss. Jena, 1899 Zur Casuistik des primären Lungenkrebses	M	61	L	No heredity. Cough, pain, dyspnœa, cyanosis. Enlarged cervical glands. Dulness with diminished fremitus, impaired respiratory motion, feeble bronchial breathing. Two tappings bloody serum. Sudden death. Duration of disease about 15 months
287	LOC. CIT.	M	52	L	No heredity. Cough, dyspnœa, pain. Dulness over left chest; diminished or absent breathing. Heart dislocated to right. Cachexia. Aspiration: bloody serum containing characteristic tumor cells. Sudden death. Duration of disease about 6 months
288	SCHNORR, Diss. Erlangen, 1891 (After Pässler) Fall von primärem Lungenkrebs	M	42	R	No clinical history
289	SCHOTTELIUS, Diss. Würzburg, 1874 Ein Fall von primärem Lungenkrebs	F	42	R	No clinical history
290	SCHREIBER, ANDREAS, Diss. München, 1906 Über einen Fall von primärem Gallertcarcinom der Lunge mit Metastasen im Gehirn	F	44	L	Disease commenced with cough and pain in chest. Clinical diagnosis: pleurisy. Sick for 9 months; then purely cerebral symptoms — headache, projectile vomiting, paralysis of left side, strabismus. No fever; no cough; no signs on lungs except slight dulness over left apex. Clinical diagnosis: tuberculosis of right cerebral hemisphere

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
No details	In both lungs and pulmonary pleuræ, numerous nodules of all sizes down to miliary. Bronchial walls not involved	No details	Alveolar structure; mostly cylindrical cells; some flat	
No details	Irregularly defined tumor in right lower lobe extending from root through lung to pulmonary pleura	No details	Cylindrical cells	
Bloody, no tubercle bacilli	Nodulated tumor containing cavity in left middle and lower lobe. Bronchial walls infiltrated with tumor	Right lung, both pleuræ, bronchial and portal lymph nodes, gastro-hepatic ligament, and right kidney	No details	Left lung had 3 lobes
No details	Tumor at root of lung following ramifications of bronchi. Bronchiectases. Thrombosis of pulmonary artery	Liver, kidneys, right suprarenal	No details	
No details	Tumor along ramifications of bronchi involving almost entire right lung, also pleura and pericardium	Left lung, cervical and axillary lymph nodes	No details	
No details	Clear serum in right chest; bloody serum in pericardium. Entire right lung firm, without air and studded with numerous nodules up to size of walnut	Substernal, tracheal and bronchial lymph nodes. Pleura, pericardium, beginning of aorta and pulmonary artery studded with miliary nodules	Lymphangitis carcinomatodes	The miliary nodules throughout lung and pleura are arranged in an anastomosing reticulum corresponding to the lymphatics. Author attempts to establish origin of tumor from endothelium of lymphatics
None	Tumor left lower lobe	Brain, both adrenals, left kidney, both ovaries	Gelatinous gland-like tubules containing much mucoid material. Bronchial epithelium and bronchial mucous glands normal. Metastases same structure	Author assigns origin to alveolar epithelium

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
291	SCHRÖDER, HUGO, Diss. Kiel, 1902 Ein Fall von primärem Krebs der Lunge	F	34	Both (?)	Pneumonia with incomplete absorption. Thereafter occasional fever; gradual development of œdœma in territory of upper cava. Cough, cyanosis, dyspnœa. Ronchi over both lungs, but nothing characteristic. Later ascites, enlarged liver, albuminuria, and hyaline casts. Clinical diagnosis: myocarditis after pneumonia. Death from erysipelas and peritonitis. Duration of disease about 15 months
292	SCHWALB, HEINRICH, Diss. Würzburg, 1894 Ein Fall von primärem Lungencarcinom	F	60	L	Always well. For a few months dyspnœa, cough, sense of suffocation. On admission great emaciation; some cyanosis and fever. Pneumonia of left lower lobe; bronchitis. Death after 2 days
293	SCHWENINGER, Annalen des Städ. Krankenhauses in München, 1876–77, Vol. II, 367	M	49	Probably L	No clinical history except that patient was sick for 2 years with symptoms of chronic pulmonary phthisis
294	LOC. CIT.	M	62	L	No clinical history
295	SEHRT, Diss. Leipzig, 1904 Beiträge zur Kenntniss des primären Lungencarcinoms	M	66	R	No clinical history
296	LOC. CIT.	F	75	R	Clinical diagnosis· pleuro-pneumonia
297	LOC. CIT.	M	68	L	Intense dyspnœa. Dulness over entire left chest with harsh respiration and rales. Death from profuse and sudden hæmorrhage. Clinical diagnosis: phthisis
298	SIEGEL, Diss. München, 1887 (After Pässler) Zur Kenntniss des Pflasterepithelkrebses der Lungen	M	63	L	No clinical history

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
Mucoid	Chronic induration of both lungs. Pneumonic consolidation of right lower lobe; pleurisy on left. Hæmorrhagic areas in both lungs diagnosed macroscopically as infarctions, but microscopically proved to be typical carcinoma	None	Hæmorrhagic areas, typical carcinoma probably from bronchial epithelium and extending along lymph channels	No clinical symptoms pointing to tumor; diagnosis only possible with microscope at autopsy
Profuse	Turbid serum in left pleura. Tumor size of an apple in left lower lobe, surrounded by inflamed lung tissue. Tumor is whitish gray, sharply defined against surrounding lung tissue. Firm fibrous masses interspersed with soft, very cellular portions of tissue	No details	Alveolar structure	
No details	Tumor nodules in both lungs	No details	Carcinomatous structure; cylindrical and polymorphous cells	
No details	Primary cancerous tumor of left upper lobe	No details	No details	
No details	Carcinoma of right main bronchus and of cavity at hilus of right lung with erosion of pulmonary artery and acute lethal hæmorrhage. Bronchiectases. Extensive chronic ulcerative tuberculosis	Bronchial and tracheal lymph nodes	Alveolar structure; pavement epithelium, cancer pearls; patches of necrosis	
No details	Bloody fluid in pleura. Carcinoma of right lung with gangrenous cavity and chronic indurative pneumonia. Carcinomatous thrombosis of pulmonary artery	Both lungs, left ventricle, left adrenal, and 5th rib	Horny pavement epithelium	
Hæmoptysis	Carcinoma of left main bronchus with extension to left pleura, bronchial lymph nodes, and large branch of pulmonary artery. Chronic ulcerative tuberculosis of left upper lobe	Bronchial lymph nodes and œsophagus	Pavement epithelium	
No details	Large tumor in left upper and lower lobes	Both lungs and left pleura	Large polygonal cells	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
299	Loc. cit.	F	68	R	No clinical history
300	Siegert, Virchows Arch. 1893, 134 Zur Histogenese des primären Lungenkrebses	F	53	L	Admitted 5 days before death suffering from hemiplegia of right side, aphasia and pleurisy with hæmorrhagic effusion in left side
301	Singer, Prag. med. Woch. 1885, pp. 329–341 Drei Fälle von intrathoracischem Tumor	M	60	R	Sudden onset with dyspnœa, cough, and increasing debility. Later dilatation superficial veins. Dulness at right apex with bronchial respiration in front; no breathing sounds posteriorly. Pain; harassing cough. Duration about 3 months
302	Singer, Diss. Berlin, 1908 Zur Klinik der Lungencarcinome	F	41	L	No heredity. Previous history negative, but had lung trouble for some years. Cough, dyspnœa on exertion. On admission emaciation, intense dyspnœa, cyanosis; no fever; no glands. Greater portion of left lung in front and behind, flat; diminished voice and breathing. Nothing on right lung. Aspiration: 1200 c.c. turbid serum. Paralysis of left vocal cord. Death in 2 days
303	Loc. cit.	M	80	L	No heredity; no previous illness. Recently weakness, pain in chest. Dulness and bronchial respiration upper left apex. No rales. Right lung and heart normal. Gradually some fever; fine crackling in left base. Sudden death
304	Loc. cit.	M	77	R	Admitted in moribund condition. Intense dyspnœa for some time, cyanosis, hoarseness, some fever. No cachexia. Tumor size of small fist emerges above sternum. Death within 24 hours after admission
305	Sirotini, Wratsch. St. Petersburg, 1905, Vol. 72, p. 58. Lubarsch-Ostertag, 1907, Ht. 2, p. 734 Two Cases of Primary Cancer of Lung	Not	stated	L	No clinical history

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
No details	Tumor in right middle lobe	Bronchial lymph nodes, pleura, liver, left suprarenal, thyroid, and both kidneys	Large polygonal cells	
No details	Extensive infiltrating carcinoma of left lung and bronchi *simulating pneumonic consolidation*. No pronounced tumor or nodules. Extensive secondary carcinosis of lymphatics	None	Alveolar structure; cylindrical cells with transition to pavement epithelium	
Foul, bloody	Cavity with hæmorrhagic contents in right upper lobe. Walls consist of partially necrotic and infiltrating tumor. Ulcerated medullary tumor in right main bronchus and its larger branches, obstructing lumen. Obstruction of upper cava	Pleura, liver, adrenals and thyroid	No details	Origin from bronchial mucous glands
Glairy	Carcinomatous thrombosis of left lower pulmonary vein. Carcinoma of left main bronchus infiltrating and occupying the bronchus of left lower lobe. Diffuse carcinomatous infiltration of left lower lobe. Carcinomatous infiltration of lymphatics of bronchi of left upper lobe	Pleura, pericardium, bronchial and peritoneal lymph nodes, left kidney, left adrenal, left ovary and in thyroid	Pavement cell carcinoma	
Scant, mucopurulent, no tubercle bacilli	Primary carcinoma of lower left lobe originating from bronchial mucous membrane. Many small pneumonic abscesses	No details	No details	
No details	Right upper lobe adherent to sternum and to ribs, infiltrated with hard carcinoma. Small bronchi and bronchioles filled with detritus and carcinomatous material; also some in upper cava. Lymph channels infiltrated	Pericardium, right pleura, sternum and upper ribs, mediastinal lymph nodes	Pavement cell carcinoma	
No details	Multiple miliary carcinoma of lower lobe	No details	Flat epithelial cells	Origin supposed from alveolar epithelium

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
306	Loc. cit.	Not	stated	R	Diagnosed during life
307	Smith-Shand, British Med. Jour. 1875, I, 844; II, 41	F	36	L	Cough, pain, hoarseness, right hemiplegia. Dulness over left chest; impaired respiratory motion; absence of breathing sounds
308	Stieb, Diss. Giessen, 1900 Über das Plattenepithelcarcinom der Bronchien	M	50	L	No clinical history except patient died of cirrhosis of liver
309	Loc. cit.	M	60	R	Cough, pain, infiltration of right apex, increasing debility. Duration of disease 6 to 8 months
310	Stilling, Virchow's Arch. Vol. LXXXIII, 1881, p. 77 Über primären Krebs der Bronchien und des Lungenparenchyms	M	52	R	No clinical history
311	Loc. cit.	F	27	R	No clinical history
312	Loc. cit.	M	70	L	No clinical history
313	Loc. cit.	M	64	R	No clinical history
314	Storer, Amer. Jour. Med. Sciences XXI, 46, 1851	M	39	R	Cough, dyspnœa. Dulness of lower ⅔ right chest and absence of breathing

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
No details	Primary carcinoma of walnut size in right lung	No details	Small polymorphous epithelial cells almost like sarcoma cells	Origin bronchial mucous membrane
Scant, bloody	Left main bronchus plugged by tumor. Left lung full of soft tumor adherent to pericardium and surrounding structures at root. Compression of left vagus and recurrent	Brain	No details	Although no microscopic examination is given, there is little doubt that this tumor is carcinoma
No details	Submucous carcinoma in bronchus of left lower lobe infiltrating surrounding lung tissue	Regionary lymph nodes	Horny pavement epithelium	
Moderate, mucoid, no tubercle bacilli	Primary carcinoma at bifurcation of right main bronchus. Gray hepatization of right upper and middle lobes	Both lungs; supra clavicular lymph nodes	Alveolar structure; horny pavement epithelium	
No details	Large tumor of bronchus of right middle lobe extending into right main bronchus, penetrating wall and infiltrating peribronchial tissue	Bronchial, mediastinal lymph nodes; also cervical nodes, pericardium, and liver	Plexiform and alveolar cancer nests; cancerous injection of lymph spaces and proliferation along vascular and nerve *sheaths*	
No details	Bloody serum in right pleura. Polypoid tumor right main bronchus and in upper bronchus. Tumor nodules in both lungs and in trachea. Bronchiectases right upper lobe.	Bronchial, cervical, and retroperitoneal lymph nodes; liver and small curvature of stomach	Same as above	
No details	Left main bronchus completely destroyed by tumor mass in left upper lobe penetrating into lower	Left bronchial lymph nodes	No details	
No details	Upper and middle lobes almost entirely converted into tumor infiltrating along blood vessels and bronchi	Bronchial, cervical, and axillary lymph nodes; left lung, liver, and left suprarenal	No details	
Tenacious mucoid	Encephaloid mass occupies more than ⅔ of right lung. Contains small cavities; tumor in right pri-	Bronchial and tracheal lymph nodes	No details	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
	Carcinoma of Right Lung with Symptoms of Hydrothorax				
315	STUMPF, Diss. Giessen, 1891 (After Pässler) Zur Casuistik des primären Lungencarcinoms	Not	stated	R	No clinical history
316	SUCKLING, Lancet, 1884, 1047 Case of Primary Encephaloid Growth of Lung	M	61	R	No heredity; no pain. Dyspnœa, cachexia. Right chest more voluminous than left. Dulness over lower right lobe with impaired respiratory mobility and absence of fremitus. Later on signs of cavity. Enlarged liver. First puncture: bloody fluid; second negative
317	SZELAGOWSKI, Thèse de Paris, 1900 Contribution a l'etude clinique du Cancer primitif pleuro-pulmonaire	F	47	L	No heredity; no serious illness. Commenced with loss of appetite, then some general stiffness and malaise; vertigo. Later attacks of suffocation. On admission intense dyspnœa, some cyanosis, bulging of left chest; absolute flatness behind to spine of scapula and in front to below clavicle; absence of voice and breathing. Heart displaced to right of sternum. Right lung normal. Aspiration: 1000 c.c. pink fluid; slight relief. Repeated puncture only small quantity fluid and but little relief. X-rays show a lobulated mass to left of vertebral column besides shadow over all of lower left lung. Intense pain and dyspnœa; dysphagia, fever, delirium. Duration of disease about 6 months
318	TILLMAN, Diss. Halle, 1889 (After Pässler) Drei Fälle von primärem Lungencarcinom	M	45	R	No clinical history
319	Loc. cit.	M	61	R	No clinical history
320	Loc. cit.	M	58	Not stated	No clinical history

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
	mary bronchus. Other organs normal			
No details	Tumor of right upper lobe proliferating along bronchial ramifications into surrounding tissue. At root, tumor extends into main bronchus and penetrates into lumen. Proliferation of tumor into pleura, pericardium, right auricle, and large vessels especially upper cava and right pulmonary artery	Regionary lymph nodes	Cylindrical, cuboid and large polymorphous cells	
Profuse, whitish; later "currant jelly" hæmoptysis. *Tubercle bacilli*	Tubercular cavity and miliary tubercles throughout right lung. In lower right lobe a large patch of yellowish tumor	No details	Alveolar tructure; polymorphous epithelial cells	
Scant; no tubercle bacilli	Left pleura thickened. Nearly whole of left lung occupied by grayish white tumor softened and degenerated in parts	Only lymph nodes at hilus	No details; author simply says "epithelial tumor"	
No details	Tumor in right lower lobe close to large bronchial branch	None	Carcinoma with cells resembling normal alveolar cells	
No details	Bronchial carcinoma of lower lobe following bronchial ramifications. Numerous small secondary nodules each surrounding small bronchus	Bronchial, mesenteric, and cœliac lymph nodes and liver	Cylindrical cells with tendency to mucoid degeneration	
No details	Primary medullary nodule in lung. Numerous secondary nodules in brain, cerebellum, and medulla. Nodules frequently show cystic degeneration	Brain, cerebellum, and medulla	Large cylindrical cells with mucoid degeneration	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
321	TURNBULL & WORTHINGTON, Arch. Path. Inst. London Hospital, Vol. II, 1908, p. 163 Two Cases of Carcinoma arising primarily in a Bronchus	M	55	L	About 7 months before admission on lifting a parcel "something gave way in his back." Ever since pain in back and down legs. Sweating and wasting of legs. Tenderness over left lumbar spine and both sciatics; no impairment of sensation. Increasing nervous symptoms; fever up to 106. Later 2 pigmented spots on inner surface right chest and several spots on chest and abdomen. Increasing emaciation and weakness. Albumin in urine and occasionally a trace of albumose. Nothing is said about physical examination of lungs
322	LOC. CIT.	M	56	R	Always healthy until 6 months before admission, then pain in left shoulder and back after lifting heavy weight. Disappeared for some time, then reappeared and persisted with occasional remissions. Loss of weight, tenderness on percussion of dorsal spine; anæsthesia of 8th left dorsal nerve; wasting of lower limbs. Remarkable absence of physical signs. X-rays show apparently deepened shadow to the left of upper descending thoracic aorta and 2 small dark shadows in lower half of right lung. Diagnosis of either aneurysm or neoplasm of lumbar spine was made. Later on symptoms pointing to lungs. Nothing said of cough, sputum, or physical signs on lungs. Symptoms mainly referable to spine — severe pains in legs, wasting of legs, bladder symptoms, incontinence of fæces, etc. Duration about 10 months
323	v. FETZER, Med. Correspondenzbl. des Würtenbergischen ärztlichen Landes Vereins, 1905, p. 139 Ein vom rechten Bronchus ausgehendes Carcinom der rechten Lunge	M	36	R	Cough, irregular fever; good appetite. Dulness at right base; diminished voice and breathing. Later dulness over left apex with bronchial respiration. No rales. Patient feels better and gains steadily in weight; leaves hospital having gained 5 kilos. Works at his trade for 4 months when readmitted with severe dyspnœa, cyanosis, and dilated veins about head, neck, chest, and upper extremities. Flatness over right chest; bronchial breathing but no rales. Intercostal spaces levelled; heart dislocated to left. Enlarged glands above right clavicle; 2 tumors on left parietal bone. Œdœma of right arm. Right pupil dilated. Duration of disease about one year

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
Once a lump of foul-smelling material size of walnut, looking like "herring roe"	Carcinoma of bronchus in left lower lobe. On outer surface both lungs many hard miliary nodules. In left lower lobe cavity size of walnut with ragged edges and containing many white nodules; communicates with bronchi of 3d and 4th order; nodular thickening of mucous membrane. Atelectasis below cavity. Nodules in both costal and visceral pleura; adhesions and effusion on both sides	Retroperitoneal, inguinal, cervical and bronchial lymph nodes, right femur, both iliac bones, lumbo-sacral vertebræ, ribs, and sternum. Nodules in both adrenals and in atrophied liver. Brain not examined	Alveolar structure lined with cylindrical cells, some cuboidal. Main bronchus, bronchioli, pulmonary arteries and vein and surrounding lung tissue infiltrated by tumor	
No details	Carcinoma of lower right bronchus. Carcinomatous lymphangitis of pleura of both lungs. Bronchitis and capillary bronchitis of left lower lobe. Myocarditis, acute endocarditis; abscess in spleen; septic infarct in right kidney. Solid nodule at back of right lower lobe communicating with bronchus	7th and 8th dorsal vertebræ pressing on cord; 7th and 8th left ribs and 8th right rib. No enlargement of lymph nodes in chest	Acinous structure with secretion of mucus but greater part is atypical	In both cases singularly small size of primary tumor and selection of bones as chief sites of secondary growth. Absence of physical signs pointing to lungs in both cases
Occasional hæmoptysis; no tubercle bacilli	No details	No details	No details	Case is interesting on account of the steady gain in weight during his stay in the hospital

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
324	v. SCHRÖTTER, H. Mitth. der Gesellsch. f. inn. Med. u. Kinderhlk. in Wien, 1907, p. 145 Demonstration eines Falles von Carcinom der Bronchien	M	30	R	Most severe hæmoptyses for 11 months. Perfectly healthy until first sudden hæmorrhage without apparent cause. Hæmorrhage repeats at intervals of 8 to 14 days. Must have expectorated about 8000 c.c. of blood. Repeated and most careful examination showed no cause for the bleeding. Nose, throat, trachea suspected. X-ray examination showed nothing; nothing found on lungs. Bronchoscope found a tumor at bifurcation of right main bronchus in right lower lobe
325	v. SCHRÖTTER, H. Zeitschr. f. klin. Med. Vol. 62, 1907, p. 508 Zur Præzisions Diagnose der Lungentumoren; bronchogenes Karzinom mit Glykogenbildung; Bemerkungen zur Histogenese desselben	M	44	R	No heredity. 5 weeks before admission cough, pain in chest, loss of weight. Dilated veins left anterior chest and abdomen. Right chest lags in respiration; flatness over right apex in front from axillary line over left border of sternum. Absence of breathing upper portion right lung; diminished in lower. Tumor suspected and demonstrated by bronchoscope in main bronchus just above bronchus of upper lobe. Excision of small piece in bronchoscope shows pavement epithelium carcinoma. Cells contain glycogen in small round spheres. Patient feels better for a time and gains in weight. Later œdœma of face, intense cyanosis; death from exhaustion
326	WACHSMANN & POLLAK, New York Med. Record, Nov. 1904 Three Cases of Primary Malignant Tumor of the Lung	M	55	R	Cough, pain, emaciation, clubbed fingers. Dulness over right upper lobe
327	WAGNER, Münch. med. Woch. 1903, p. 133 Primäres Bronchialcarcinom	Not	stated	L	No clinical details except that there was normal percussion note and breathing over whole left lung, but that vocal fremitus was markedly diminished, almost abolished, and that at a very early stage of the disease the clinical diagnosis of tumor of the lung probably starting from bronchus could be made
328	WALDMANN, ANTON, Diss. München, 1902 Ueber primäres Carcinom des Lungenparenchyms	M	69	L	Emphysema; bronchitis. Gradual loss of weight; pain; swelling in region of liver. Six months later fever and dulness over right upper lobe. Fever disappears, but dulness remains and increases. Two months later cerebral symptoms and tumor perforating skull. Duration about 9 months. Clinical diagnosis: primary tumor of lung with cerebral metastases

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
Severe repeated hæmoptysis	No details	No details	Examination of small portion removed by probatory incision showed carcinoma	
Often bloody. Later hæmoptysis. No tubercle bacilli	Carcinoma of right main bronchus with carcinomatous degeneration of right upper lobe. Proliferation into superior cava. Induration and cheesy tubercular remnants in right apex. Tumor of lung contained cavity	None except upper lobe	Pavement epithelium	There was not much dyspnœa
Profuse, bloody. No hæmoptysis. Contains cells suggesting "tumor cells"	Ulcerated right upper bronchus; infiltrating tumor following lymph channels in lung, also in pleura	Left lung, lymph nodes of neck and chest; liver, thyroid gland	Carcinoma	
No details	Proliferating tumor obstructing lumen at final division of left main bronchus	Left lung, anterior mediastinum, and left lobe of liver	Cylindrical cell carcinoma	Origin from bronchial mucous membrane
Bloody; no tubercle bacilli; no tumor elements	General carcinomatosis of left upper lobe. Cancerous pleurisy of both sides	Liver, both kidneys, dura, brain, bones of skull	Typical pavement epithelium	Author assumes alveolar epithelium as origin of tumor

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
329	W[illegible], W. H. A Practical Treatise on Diseases of the Lung, etc. 4th Ed. London, 1857.	M	Not stated	R.	Exclusively psychic symptoms. Neither local nor systemic symptoms pointing to lungs. No cough. Duration about 3 months
330	W[illegible]. Lancet, XIX. 1871	M	Not stated	R.	Pain, dyspnœa, cough. Swelling and cyanosis of face, neck, arms, and chest. Supraclavicular glands. Dulness over right chest; bronchial breathing above, diminished or absent breathing below. Duration about 2 months
331	W[illegible], Diss. München, 1882 (After Pässler) Ein Fall von primärem Lungencarcinom	M	64	Both	No clinical history
332	W[illegible], Zeitsch. f. Heilk. 1901, II, 78 Beitrag zur Klinik der malignen Lungengeschwülste	M	42	R.	No heredity. Fever; cough. Increasing dulness over right apex; to a less degree over left. Diminished fremitus; bronchial respiration. Pain, dysphagia, dilated veins. Enlarged axillary glands; compression of trachea. Dyspnœa, œdema of larynx. Œdema of face and arms. Cyanosis. Death after profuse hæmoptysis. Duration of disease about one year. Diagnosis made during life.
333	Loc. cit.	M	62	R.	No heredity. Pain, cough, dyspnœa, emaciation. Secondary tumors in various parts of body. Dulness, diminished and absent breathing over most of right chest. Spleen enlarged. Purulent effusion in right pleura. Duration of disease about 10 months

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
None	Infiltrating encephaloid cancer throughout right lower lobe	Left lung and brain	No details	
Frothy; later hæmoptysis	Entire right lung converted into scirrhous tumor with cavities and beginning suppuration	Mediastinal lymph nodes	No details	
No details	Scirrhous tumor of both lungs	No details	Pavement epithelium proliferating from peripheral portions into otherwise normal pulmonary alveoles	
Mucoid, occasionally bloody, hæmoptysis. No tubercle bacilli. Abundant epithelial cells	Carcinoma of right upper lobe beginning in a secondary bronchus and involving main bronchus, trachea, left main bronchus, upper cava, both pleuræ, 2d and 3d ribs and intercostal muscles. Bronchiectasis right middle lobe	Bronchial and cervical lymph nodes	Fibrous stroma; cylindrical epithelial cells	
Tumor particles are found	Carcinoma of right main bronchus; abscess and necrosis of right lower lobe	Liver, kidney, muscles, intestines, parietal bone, brain	Alveolar structure; cuboid epithelial cells	
No details	Tumor in right upper lobe	Both lungs, regionary lymph nodes, liver, spleen, kidneys	Small cuboid cells	
No details	Tumor size of walnut in secondary bronchus and left lower lobe	Bones	No details	
None	Hard mass at root of right lung following main bronchus which it compresses. Spreads throughout lung along bronchial ramifications. Two abscess cavities	Left lung and liver	Cancer with well-developed stroma	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
337	Loc. cit.	M	62	R	Brother died of cancer of liver. Cough, rapid emaciation. Physical signs like preceding case. Enlarged supraclavicular glands. Diagnosis made during life. Duration about 10 months
338	Wieber, Diss. Berlin, 1889 Primäres Lungencarcinom, etc.	M	49	R	Family history of cancer. Asthma and bronchitis. Later pain and tumor in leg which was amputated. Tumor found to be carcinoma. Cachexia; cough. Death from exhaustion
339	Willanen, Zeitschr. f. Krebsforsch. 1905, III, p. 618. Wratsch (Russian) 1904, No. 44 Zwei Fälle von primärem Lungencarcinom	Not	stated	?	Clinically the symptoms of catarrhal pneumonia. Cough, dyspnœa, and cachexia
340	Loc. cit.		Not	stated	Clinical symptoms those of chronic consolidation of the lung. Cough, dyspnœa, and cachexia
341	Willert, Diss. Würzburg, 1905 Beitrag zur Casuistik des primären Lungencarcinoms	M	48	L	No heredity; always healthy. Cough, increasing debility. Dulness over left lung; diminished breathing; some bronchial respiration. No pain, dyspnœa, or fever. Later paralysis left hypoglossal and facial; complete left hemiplegia
342	Withauer, Therapeut. Monatshefte, 1899, April, p. 185 Das primäre Lungencarcinom	F	62	R	No heredity. Some dry cough, but complains mainly of stomach. Intense hunger, but disgust for food; occasional vomiting. Flatness, increased resonance, and absence of respiratory sounds over right infraclavicular region. *Heart sounds are heard with especial loudness over this area.* Dyspnœa, pain over both lungs, harassing cough, emaciation. Slight bulging of dull area
343	Wolf, Fortschritt. der Med. XIII, 1895 Der primäre Lungenkrebs	M	54	L	The clinical picture is that of chronic phthisis. Nothing to indicate tumor
344	Loc. cit.	M	57	R	Clinical history that of chronic phthisis

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
Occasionally bloody	Around main bronchus a white firm tumor penetrating lung following bronchi. Consolidation and ulcerated cavity at root of lung	Tracheal and cervical lymph nodes; liver and both kidneys	Scirrhus	
No details	Tumor size of walnut in middle of right lower lobe. Tumor infiltration throughout lower lobe surrounded by broncho-pneumonic consolidation	Lung, liver, bronchial lymph nodes. Left leg	No details	Author considers the lung tumor the primary one
No details	Miliary cancer nodules originating from smaller bronchioles and alveoli	No details	No details	
No details	A well-defined tumor	No details	No details	
Occasionally bloody. Repeated hæmoptyses	Bloody effusion in left pleura. Large tumor in left upper lobe; somewhat smaller one in left lower lobe. Walls of bronchi and blood vessels infiltrated. Mucoid areas in tumor	Mediastinal, perigastric and periaortic lymph nodes. Liver, brain, kidneys, right adrenal and thyroid	Gland-like arrangement; principally cylindrical epithelial cells changing to cuboid and some flat polymorphous forms. Distinct secretion of mucus	Author calls tumor carcinoma myxomatodes. Origin probably bronchial mucous glands
No details	Large tumor in right upper lobe	Both lungs, liver, and kidneys	No details	
No details	Tubercular cavity in left lung in which carcinomatous tumor proliferates	Right pleura and left intercostal muscles	Pavement epithelium with typical cancer pearls	
No details	Tubercular cavity in right upper lobe containing polypoid cancerous excrescence near the efferent bronchus of the cavity. Walls of	No details	Pavement epithelium with cancer pearls	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
345	Loc. cit.	M	64	R	No heredity. Emphysema, bronchitis, emaciation. Pleurisy and pneumonia of right lung; after which dulness remains. Pain; increasing dyspnœa.
346	Loc. cit.	M	56	L	Signs of pulmonary phthisis. Heart pushed to left. Sudden death from hæmorrhage
347	Loc. cit	M	54	R	No clinical history
348	Loc. cit.	M	44	R	Pain in right chest; cough. Dulness over upper portion right chest; feeble respiration. Increasing emaciation. Left lung normal. Duration about 2 months
349	Loc. cit.	F	42	R	Cough, dyspnœa, dulness over right

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
	bronchus thickened and mucous membrane ulcerated. Tubercular granulations all over neoplasm			
Mucoid; later bloody. No tubercle bacilli or tumor cells	Middle and lower lobe converted into large tumor penetrating diaphragm and continuous with secondary tumor in liver	Liver	Fibrous stroma; alveolar structure; flat epithelial cells. Epithelial pearls in acinous alveoles	
Hæmorrhage	Tumor in left apex. In left upper lobe large cavity with necrotic walls; left main bronchus almost completely destroyed by tumor. Tumor surrounds necrotic walls of cavity. Miliary tubercles over right pleura	No details	No details	
No details	Tumor in right lower lobe penetrating between 7th and 8th ribs. Cavity in centre of tumor surrounded by nodulated neoplasm. Cavity communicates with lower main bronchus, the walls of which are partially destroyed by tumor	Bronchial lymph nodes	Alveolar structure; small oval epithelial cells	
Yellow, no tubercle bacilli, some blood	Prominent tumor of right upper lobe perforating into right upper bronchus with destruction of its walls. The cancer is surrounded by fresh miliary tubercles. Both suprarenals are tubercular; tubercular ulcer in ileum	Both lungs pleura, pericardium, liver	Alveolar structure; small oval or cylindrical cells	Histogenesis not to be determined
Scant, no blood or tubercle bacilli	Small hard nodules at root of right lung. Polypoid excrescences on mucous membrane of larger bronchi. Bifurcation surrounded by large tumors of bronchial and tracheal nodes. Fresh miliary tuberculosis of both lungs	Bronchial and tracheal lymph nodes. Pericardium	Large alveoli filled with polymorphous small epithelial cells. Miliary cancer throughout both lungs	Histogenesis not to be determined
Slightly bloody, but contains neither tubercle bacilli nor tumor particles	Irregularly defined, hard tumor in left lung. Cheesy pneumonia in left upper lobe also several tumor nodules. Tubercular pleuritis	Pericardium, left auricle, left ventricle and lung	Alveolar structure; round and cuboid epithelial cells	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
351	Loc. cit.	M	65	R	Clinical picture dominated by cerebral symptoms
352	Wolf, Loc. cit.	M	58	R	No heredity. Paralysis of left arm and leg. Painful swelling of nose and epistaxis. Dyspnœa and emaciation. Impaired motility of right chest. Flatness right apex; dulness below. Bronchial respiration. Heart displaced to right
353	Loc. cit.	M	42	R	Clinical picture dominated by brain symptoms
354	Loc. cit.	M	66	L	Symptoms of cavity in right chest
355	Loc. cit.	M	47	R	Pain in right chest, dyspnœa, dry cough, emaciation. Dulness over right chest; bronchial breathing. Enlarged, painful liver; ascites. Some fever
356	Loc. cit.	M	54	L	Anorexia, debility, emaciation. Flatness over left chest; diminished breathing; absence of voice. Duration about 6 months
357	Loc. cit.	F	54	R	Sudden onset with chill and pain in right chest. Dulness; friction at right base; fever. Later pericarditis. Increasing dyspnœa; death. Duration about 5 weeks
358	Loc. cit.	M	51	R	No heredity. Acute onset with pleurisy. After that emaciation and cachexia. Loss of patellar reflexes; left pupil larger than right. Friction over right lung. Duration of disease about 3 months
359	Loc. cit.	M	64	R	No heredity. Commenced with anorexia and emaciation followed by symptoms of right pulmonary phthisis; death after a few months without characteristic symptoms

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
No details	Ulcerated right main bronchus leading into large tumor at the root adherent to bronchial nodes. Trachea compressed; bronchiectatic dilatations	Bronchial lymph nodes; brain	Pavement epithelium	Bronchial mucous glands normal
Glairy, shortly before death bloody, no tubercle bacilli	Retraction of entire right lung; dislocation of heart. Right main bronchus almost completely filled with cauliflower-like tumor. Smaller bronchi of lower and middle lobes, same tumor. Tumor penetrates into right pulmonary vein and proliferates into left auricle. Pneumonia left lower lobe	Left lung, dura mater, tip of nose, nasal septum; right supraclavicular lymph nodes	Adeno-carcinoma	Histogenesis not to be determined
No details	Ulceration of right main bronchus; tumors in right upper and lower lobes; latter contains cavity perforating into pleural cavity	Tracheal and bronchial lymph nodes, brain, spleen, kidneys	Alveolar structure; large polymorphous and cylindrical cells	
No tubercle bacilli	Circular obstructing cancer in left main bronchus extending to lower lobe. Cavity in tumor	Bronchial lymph nodes and liver	Alveolar structure; cylindrical cells	Origin from bronchial mucous glands
No details	Right main bronchus filled with cancer proliferating from its walls, extending into trachea. Tumor nodules in right lung	Right pleura, intercostal muscles and ribs, vertebræ, liver, dura mater	Alveolar structure; polymorphous cells	
Mucopurulent, no tubercle bacilli; no blood	Hard carcinoma of main bronchus completely obstructing it; left lung retracted. Bloody serum in abdomen; miliary tubercles in liver	Miliary carcinosis of peritoneum	Cylindrical cells	
Rusty	Right lower lobe and part of middle lobe destroyed by medullary cancer; right lower lobe adherent to pericardium	Lower cava, right auricle; liver	No details	
No details	Carcinoma of lower branch of right main bronchus	Lung, spleen, liver, right pleura, muscles of back, brain	No details	
No details	Carcinoma of right main bronchus; bronchiectases in both lungs	Right kidney, liver; spleen	No details	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
360	Loc. cit.	M	57	L	Pleuritic effusion in left chest. Aspiration: pus. Resection of 9th left rib with removal of 2000 c.c. of thick putrid pus. Death
361	Wolf, Loc. cit.	M	54	R	Aspiration of clear serum from right pleura; dulness not affected. Abscess over 8th rib opened and rib resected. Death after a few weeks
362	Loc. cit.	M	60	R	Cough, emaciation, bronchitis. Redness and swelling left side of neck; fluctuating retropharyngeal swelling
363	Loc. cit.	M	63	Both	No clinical history except died of suffocation on day of admission
364	Loc. cit.	F	54	L	Pain, emaciation. Complete dulness left lung; no voice or breathing sounds A fluctuating swelling at angle of left scapula found on incision to be tumor penetrating from interior of chest. No cough
365	Loc. cit.	M	69	R	Clinically characteristic of pulmonary phthisis
366	Loc. cit.	M	67	L	No heredity. Dyspnœa, dysphagia, emaciation. Pain in left arm. Upper left chest bulging. Flatness and absence of breathing over left upper lobe
367	Loc. cit.	M	75	L	No heredity. Well until 3 weeks before admission; then increasing

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
No details	Carcinoma of left main bronchus and its ramifications. Large cavity in left lower lobe. Extensive cheesy broncho-pneumonia of right lung	Pericardium, liver, left kidney, and right suprarenal		
Mucopurulent	Right main bronchus completely filled with papillary growths firmly adherent to its walls. Tumor penetrates into right lung forming a large tumor in upper and lower lobes. Large vessels compressed; upper cava perforated and filled with tumor	Mediastinal lymph nodes; left auricle, kidneys, left suprarenal	Pavement epithelium resembling epidermis	
No details	Cavity in right upper lobe communicating with bronchi completely closed by tumor originating from their walls	Left kidney, 3d cervical vertebra with destruction of bone and compression of cord; also left ventricle and bronchial lymph nodes	Pavement epithelium	
No details	Papillary proliferation almost completely closing lower portion of trachea and extending into both bronchi. Also large tumor surrounding trachea and large bronchi and compressing upper cava	Both lungs, liver, spleen, and left kidney	No details	
None	Entire lower lobe converted into large cavity the walls of which consist of white tumor. Main lower bronchus communicates directly with cavity and is obstructed by proliferating tumor	Bronchial lymph nodes and lung	Pavement epithelium	
No details	Tumor proliferation in right main bronchus; bronchiectatic cavities in right lower lobe	Bronchial lymph nodes and liver	Pavement epithelium	
No details	Left main bronchus almost completely filled with tumor which proliferates from its walls and extends along ramifications into left upper lobe forming large hard, white tumor	Bronchial and retroperitoneal lymph nodes; pericardium	Pavement epithelium	
No details	Carcinoma of left main bronchus and left lung	No details	Alveolar structure;	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
					hoarseness, pain in chest, dyspnœa, dysphagia, and palpitation. Paralysis of left recurrent. No signs in heart or lungs. Treated for 6 months by electricity and felt well; then rapid failing, dyspnœa, effusion in left pleura
368	Loc. cit.	M	56	L	Father died of cancer of the stomach. Well until a year ago, then dyspnœa, debility, and emaciation. Left upper chest retracted and impaired respiratory motion. Dulness over left lung with loud bronchial breathing
369	Loc. cit.	M	55	R	No clinical history
370	Wolf, Loc. cit.	M	47	R	Always well. Disease commenced with paralysis of right vocal cord and dysphagia. Soon thereafter dyspnœa and a sense of suffocation. Later intense tracheal stenosis. Hard nodules in thyroid which seem to extend up from below sternum. Dulness over sternum and on right side behind. Tracheotomy, with long canula introduced into right bronchus. This is followed by putrid bronchitis, impaired deglutition, increasing debility. Double pleuro-pneumonia; death
371	Loc. cit.	M	63	L	Sudden onset with anorexia, debility, pain in lower abdomen, emaciation, icterus, œdœma of skin of abdomen and lower extremities. Liver much enlarged; no nodules can be felt. *Nothing found in lungs.* Duration of disease only about 3 weeks
372	Loc. cit.	F	54	R	Clinical symptoms of pleurisy with effusion
373	Loc. cit.	M	59	Both	No heredity. Well until 6 months before admission when dyspnœa, pain in chest, cough. On admission cyanosis, impaired respiratory motion of left chest. Dulness from middle of

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
			pavement epithelium typical giant cells	
Bloody, no tubercle bacilli or tumor cells	Left main bronchus completely obstructed by carcinoma proliferating also into trachea and right bronchus. Greater part of lung converted into solid tumor extending along bronchial ramifications	Bronchial lymph nodes, pericardium, heart, thyroid, and both suprarenals	Scirrhus-like; small round and cuboid cells	Origin from bronchial mucous glands
No details	Carcinoma of right main bronchus	Bronchial lymph nodes, right lung, liver, lymph nodes around portal vein, retroperitoneal nodes and bodies of 7th to 10th dorsal vertebræ	Alveolar structure; broad connective tissue bands of stroma; large and oval epithelial cells	Origin probably from bronchial mucous glands
No details	Just below right lobe of thyroid a large tumor which penetrates into right upper chest adherent to bones which are not affected. Lobulated tumor from bifurcation extending into right main bronchus, penetrating its walls, and extending into surrounding lung tissue. Tumor in upper lobe in direct contact with large tumor on thyroid	Bronchial lymph nodes	No details	
No details	Left main bronchus and bronchus from left upper lobe obstructed by cancer. Walls of both bronchi infiltrated	Bronchial lymph nodes and liver	No details	
No details	Obstruction of right main bronchus by cancer. Surface of right lung covered with net of lymphatics injected with white tumor material	Bronchial lymph nodes, right pleura, pericardium	No details	
Hæmoptysis; tubercle bacilli	Carcinoma growing from walls of both bronchi and trachea and obstructing their lumen. Continuous with this a tumor spreading	Left auricle; œsophagus and left kidney	No details	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
					scapula downwards; no fremitus. Dulness over right apex with feeble respiration and rales. Aspiration evacuated large quantities of clear serum. Death with symptoms of progressive tuberculosis
374	Zimmermann, Berlin. klin. Wochenschr. 1887	M	50	L	Diagnosed first as tuberculosis; then as syphilis. Dulness over entire left anterior chest extending to lateral and posterior aspects to below spine of scapula. Over this area bronchial breathing and dry rales. Bulging of left chest; intercostal spaces obliterated. All symptoms and signs disappeared under antisyphilitic treatment; then reappeared; again slight improvement under mercury followed by rapid failure and death

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
	over both lungs and into left auricle. Pulmonary veins compressed. Lesions of old and more recent phthisis			
At first fibrinous, then rusty	Jelly-like mass at apex of left lung; remainder of left lung diffusely infiltrated with carcinoma. Large abscess behind sternum; another behind pericardium	*None*	Carcinomatous structure	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
1	BARCLAY, H. C. New Zealand Med. Jour., V, 1892, 170–172 Sarcoma of Lung	M	18	L	No heredity. Disease commenced with pain at right base, some cough, slight temperature. Dulness over greater portion of left chest; absence of vocal fremitus, some harsh respiration and diminished breathing sounds. Emaciation. Temperature at times to 104. Gradually bulging over left chest; œdœma of left arm and chest. Glands above left clavicle. Two exploratory punctures practically negative. *Pain always at right base*
2	BAUMAN & BAINBRIDGE, Lancet, 1903, I Primary Sarcoma of the Lung	F	3 yrs. 11 mos.	L	Well until 6 weeks before admission. Illness commenced with headache and abdominal pain; later emaciation, cough, hæmoptysis. Flatness, diminished voice and breathing, bulging of intercostal spaces, displacement of heart to right. Fever 101. Aspiration recovered only a small amount of bloody fluid without anything characteristic. Duration 8 weeks
3	BELL, Monthly Jour. Med. Science, London, 1846–47	M	28	L	Pain in sternum; later severe cough, dyspnœa, and vomiting. Retraction of left chest; imperfect expansion, no fremitus. Dulness over entire left lung in front and behind; absence of breathing sounds; numerous rales. Œdœma of upper and lower extremities; diarrhœa. Duration of disease about 3 years
4	BJÖRNSTEN, Centralbl. f. Path. Anat., Vol. 15, 1904, p. 513 Über Lungen und Herzgeschwülste bei Kindern (Swedish)	F	2	R	No clinical history
5	BLUMENTHAL, Diss. Berlin, 1881 Zwei Fälle von primären malignen Lungentumoren	M	20	L	For several years pain in left arm; 7 months before admission swelling on left chest; later swelling in left axilla reaching size of a child's head. No respiratory disturbances. Dulness over left chest more in front than behind, with absence of breathing sounds. No cough; no sputum. Fluctuation in axillary tumor. Aspiration withdraws a light green, clear, mucoid fluid
6	BOCK, A. F. Weekly Med. Review, St. Louis, Vol. XIX, 1889, p. 512 Primary Sarcoma of the Lung	F	5	L	No heredity. Disease commenced with fever and severe pain in left side, the latter continuing until death. Fever yielded to quinine (probably malarial). No cough; some dyspnœa. Sweating of right half of body; left always dry. Left thorax larger than right. Impaired respiratory motion; enlarged superficial veins. Marked

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
Scant, bloody	Old and recent pleuritic adhesions in right chest. Effusion in left pleura. Greater part of left lung replaced by hard, nodular tumor. Smaller bronchi occluded	None	"Small celled sarcoma"	
Hæmoptysis	Upper lobe of left lung replaced by soft sarcomatous tumor. Pleura thickened	None		
Abundant, *green* and fœtid	Lower left lobe one large cavity with hard irregular walls, filled with green fluid. Numerous spherical nodules excavated in some manner scattered through remainder of left lung and in right	None except nodules mentioned in right lung	None given	Although no microscopic examination is given, the age of the patient, sputum and character of the nodules speak for sarcoma
Not given	Entire right lung transformed into soft nodular tumor. Large vessels at heart surrounded by tumor	Left lung, pericardium and heart muscle	Round celled sarcoma	
None	Left pleura 400 c.c. bloody fluid. Upper lobe of left lung compressed and flattened. Of the lower lobe only a narrow border of highly compressed lung tissue remains, all the rest taken up by a large tumor which has eroded several ribs, and which has penetrated into the axilla and compressed the brachial plexus	None	Myxosarcoma	
None	Entire left thorax occupied by white tumor mass without visible lung structure. Left bronchus entirely obliterated. All other organs healthy	None	Large spindle celled sarcoma	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
					emaciation. Flatness and absence of breathing sounds over all of left lung. Heart to right of sternum. Repeated aspiration only small quantity seropurulent fluid. Sudden death during aspiration. Duration of disease 2 months
7	Box, C. R. St. Thomas Hosp. Reports, 1896, p. 260 Sarcoma of Lung	M	5	L	No heredity; good health until 6 months before admission, when gradually increasing lump under angle of left scapula. Slight cough, pain, increasing dulness over upper left chest. Diminished voice, breathing and fremitus. Negative aspiration. Later dilatation of superficial veins; enlargement of axillary and cervical glands. Later dulness and tubular breathing over right upper lobe. Occasional fever. Extreme dyspnœa and cyanosis. Duration of disease about 11 months
8	Bramwell, Byron, Clinical Studies, Vol. I, 1903, p. 130 Solid Intrathoracic Tumor	M	57	L	Illness commenced 7 months before admission with dyspnœa on exertion, weakness, hoarseness, cough, pain in left chest. Luetic infection admitted. Dulness all over left chest, more flat on upper part than base. Loud bronchial breathing at base, increased vocal fremitus; no rales. Puncture negative. Left chest ½ inch more than right. Heart not displaced. Patient was treated with KI and improved somewhat; gained 7½ pounds in weight. Physical signs remain the same. Sudden death
9	Braureuter, Diss. München, 1881 (after Pollak) Primäres Sarkom der Lunge und der Bronchialdrüsen	M	56	R	No clinical history. Admitted unconscious and moribund; died after 5 days
10	Chiari, Wien, 1878, No. 6 (quoted after Fuchs) Anzeiger der Gesellschaft der Arzte	F	14	R	No clinical history except that child died of facial erysipelas and general œdœma
11	Coats, Joseph, Glasgow Med. Jour., New Series, Vol. VI, 1874, p. 274		Not mentioned		No data except persistent vomiting and symptoms of laryngeal obstruction

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
Not mentioned	Nearly the whole of left lung converted into a softening tumor continuous with large external mass. Erosion of 5th to 8th ribs. Large hard tumor infiltrating upper and middle right lobes, adherent to upper dorsal vertebræ and infiltrating dura. Cord healthy. All other viscera healthy	Right lung, vertebræ, spinal dura	Not given	
Scant, no blood. Later thick, dark brown mucus containing large fatty granular cells. Puncture into lung showed the same cells	Large new growth from root of lung and bronchial glands extends in large masses along bronchi into lung. Left main bronchus completely occluded, the lung collapsed and airless. Bronchiectasis in lower lobe. Arch of the aorta completely surrounded by tumor	Only bronchial lymph nodes mentioned	No details given; simply stated sarcoma	
Not mentioned	Enormous enlargement of bronchial glands of right hilus with abscesses. Nearly half of right lower lobe converted into sarcomatous tumor proliferations from the hilus, mostly along bronchial ramifications	No details	Lymphosarcoma	
Not mentioned	Upper lobe of right lung hard and firm; middle and lower lobes compressed. In lower part right lobe pneumonia. Section of upper lobe could be completed only *with a saw*, and showed a spherical tumor 10 cm. in diameter. In interior of tumor bronchioles could be made out	None	Spindle celled sarcoma with calcification	
No details	Disease centred in lymph nodes at root of lung and extended from there to glands of neck, many as large as	Not mentioned	Lymphosarcoma	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
	A Case of Lympho-sarcoma of the Bronchial Glands				
12	COCKLE, Medical Times & Gaz. Oct. 29, 1881, p. 518	F	44	L	Dyspnœa. Absolute dulness, absence of voice and breathing over entire left chest. Heart displaced. Later increasing dyspnœa and diarrhœa; then coma, convulsions, and death
13	COHEN (S. SOLIS) & KIRKBRIDE, Proceedings of Path. Soc. of Philadelphia, New Series, Vol. III, 1900, p. 200 Tumor (Sarcoma?) of the Mediastinal and Bronchial Glands; Metastases in Liver. Rupture with Fatal Hæmorrhage	M	30	R	Pain in lower right chest. Right pupil larger than left. Nothing said about cough, sputum, temperature, etc. Enormously enlarged nodulated liver, left lobe simulating enlarged spleen. Right lung expands less than left. Irregular areas of dulness in lower chest with diminished breathing and absence of fremitus. Hæmoglobin 60; reds 4,400,000; whites 18,000. Albumin and casts in urine. Aspiration shows serosanguinolent fluid with enlarged leucocytes. Slight dyspnœa, sudden collapse, death
14	COLOMIATTI, Rivista Clinica di Bologna, 1879, Gennaio Virch. Jahrbuch for 1879, I, p. 267	Not given			No data
15	CURRAN, Lancet, 1880, II, p. 258	M	10	L	*Blow on left chest;* later swelling of that spot and fever. Puncture negative. Signs of pneumonia over left apex. Dulness on both sides lower down. Scarcely any respiratory movement of left chest. Copious hæmorrhages. Rapid increase of tumor. Duration of disease about 5 months
16	DAVIES, ARTHUR, Transactions London Path. Soc., XL, 1889, p. 46 Lymphosarcoma of Left Lung	M	18	L	Pleurisy a year and three quarters before admission to hospital. 9 months before admission cough, gradual loss of weight, night sweats, dyspnœa, pain in left chest. Shortly before admission pain in right groin. Physi-

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
	a hen's egg. Pericardium, both parietal and visceral involved. At auricles muscle had been replaced by tumor which penetrated into cavity of auricles, both right and left. Growth extended likewise into trachea, bronchi, and lungs. Right vagus buried in tumor and its tissue involved			
Hæmoptysis	Bloody serum in left pleural sac. Upper part left pleura and lung filled with soft tumor. Tumor apparently from hilus along bronchial ramifications. Left pulmonary vein obliterated	Retroperitoneal lymph nodes	Round celled sarcoma	
No details	Abdomen contains 2,000 c.c. of blood and large clots from two rents in liver capsule, which is enormously distended by layers of swollen tumor nodules. Anterior mediastinal glands much enlarged; tracheal and right bronchial glands also enlarged. Heart and large vessels pushed somewhat to the left. Several small nodules in left lung, also in left bronchial glands. Right bronchial glands enormously enlarged; right main lower bronchus almost occluded by tumor; this tumor passes along bronchial ramifications and infiltrates lower lobe. Separate tumor nodules in right lung.	No others mentioned	Unsatisfactory	Probably lymphosarcoma, possibly from bronchial glands
	Right upper lobe converted into an amber-colored gelatinous neoplasm	No details	Spindle cells and peculiar form of giant cells	Original not accessible. I. A.
Hæmorrhages	Left lung consisted of a mass of what the author calls "medullary cancer," which had eroded 7th to 9th ribs and penetrated chest wall	None	No details	Probably sarcoma
Mucopurulent frequently bloody	Large tumor above left clavicle; large mass above Poupart's ligament filling up hollow of ilium to median line; several nodular masses below this. Left pleural	Liver, retroperitoneal lymph-nodes; over spine eroding vertebra	Round celled lympho-sarcoma	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
					cal signs were those of commencing phthisis with rapid consolidation with cavity at left apex. In the course of 3 weeks cavity disappeared and complete dulness with loss of voice and breathing sounds took its place. Heart pushed to right side. Large neoplasm appeared in right groin and eventually smaller growths above left clavicle. Duration of disease at least 15 months; probably longer
17	DEMANGE, Revue Méd. de l'Est, IV, 119 (Quoted by Fuchs)	M	37	L	For 5 months increasing debility and emaciation. Pain in *right* chest; dulness over left chest with absence of breathing. Heart dislocated to right. Later œdœma of left chest, enlargement of liver, dyspnœa and cough. Exploratory puncture negative; sudden death
18	DE RENZI, Giorn. Internaz. de Soc. Med. Napoli, 1885 Sarcoma primario del Polmone	M	40	R	Pain in right chest and hypochondrium; headache, epistaxis; swollen glands in neck
19	DICK, J. A. Australian Med. Gaz., Vol. XV, 1896, p. 50 Notes in a Case of Primary Malignant Disease of the Lung	F	40	R	Symptoms of pleurisy with effusion of right side; 3 months later puffy swelling of face and neck; slight cyanosis; dilatation of veins over right chest; orthopnœa; impairment of respiratory motion. Absolute dulness over right chest in front and behind except small area over apex. Absence of voice and breathing; everything else normal. Death 4 months after first examination
20	DUCKWORTH, British Med. Jour., 1885, I, 943 Malignant Disease of the Lung	M	52	R	Incomplete left hemiplegia; cough; flatness below 4th rib with absence of voice and breathing. Purulent fluid in pleura; pain in right chest
21	ELKAN, JULIUS, Diss. Münch., 1903 Über primäre Sarkome der Lunge im Anschluss an einen Fall von primärem Sarkom der linken Lunge	M	57	L	For some time cough and bloody sputum, then swelling of hands and feet; slight rise of temperature for weeks; some loss of strength and dyspnœa. At first examination lungs found normal except some dry rales at about 3rd left rib anteriorly. Systolic murmur at apex of heart. History of syphilis. Clinical diagnosis at that time bronchitis with myocarditis. Temporary improvement. X-ray showed a dense shadow over whole of left upper lobe. Supraclavicular glands enlarged. Diagnosis of tumor made principally by X-ray picture. Duration of disease about 10 months

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
	cavity completely obliterated and the whole left chest filled with hard new growth; hardly any lung substance visible. Neoplasm penetrates diaphragm into abdominal cavity. Nothing on right lung	and involving pancreas; right iliac bone and lymph nodes		
None	6 to 8 encapsulated tumors from the size of a pigeon's egg to that of a fist in left lung. No bronchi could be traced in them. Left main bronchus completely filled with tumor. Thrombosis of pulmonary artery	None	Fasciculated sarcoma	
Not mentioned	Round celled sarcoma of right lung compressing right bronchus	No details	Round celled sarcoma	
Mucopurulent and bloody	Clear serum in right pleura. Neoplasm at root of right lung pressing on venæ cavæ and right auricle. Right lung reduced in size; neoplasm extending along bronchial ramifications throughout right lung. Growth surrounds right main bronchus and involves bronchial glands. Bronchiectatic cavity in lung	No others	Mixed, round and spindle celled sarcoma	Diagnosis of tumor made during life. Author believes tumor to have originated in lung tissue itself
Profuse, mucoid, hæmoptysis	Neoplasm from root of right lung, proliferating along bronchial ramifications and invading right lung	Various parts of brain, liver, pancreas	Round celled sarcoma	
Bloody, no tubercle bacilli, but always "Herzfehlerzellen" and some granular cells	Bloody serum in left pleura. Large encapsulated greenish tumor in left upper lobe	Nodules on pleura; tumor infiltration of 2nd, 3rd and 4th ribs	Medullary spindle celled sarcoma	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
22	FARRELL, Maritime Med. News Halifax, XIII, 1901, p. 291 Lympho-sarcoma of Lung	M	Not stated	L	Soldier; complained of pain in neck and shoulders for 9 to 10 months, also in left chest. Loss of flesh, short breath on exertion. On admission complete flatness over left lung in front from 4th rib down; absence of breathing and fremitus. Posteriorly flatness from spine of scapula down; loss of voice and breathing. Slight dulness and absence of breathing at right base. Heart displaced to right. Diagnosis: pleurisy. Aspiration: "dark fluid." Death 5 days after admission
23	FERRAND, Sarcome primitif du Poumon gauche (after Chauvain)	F	32	L	Ill for about a year before admission to hospital, but nevertheless gives birth to a normal child. Pain in chest; dulness to about middle of left lung; abolished breathing; harassing cough; bulging of chest, respiratory immobility; displacement of heart. No fever, but emaciation. Enlarged axillary glands. Diagnosis made during life
24	FINLEY, Medical Times and Gazette, London, 1885, Vol. I, p. 145 Case of Lympho-sarcoma of Left Lung with great displacement of Heart	F	32	L	No heredity. For 3 years before admission failing strength and pain in epigastrium and lower part of sternum. Cough, emaciation, dyspnœa. Lies on back and left side and any attempt to change position brings on cough and suffocation. Tumor below clavicle extending towards axilla; similar smaller mass above clavicle, and a large irregular mass from left interspace to breast. Left chest larger than right and immobile on respiration. Nearly all of left chest in front and behind revealed absence of breathing and absolute flatness. Heart displaced far over to right. Œdœma of face, left arm, and chest. Duration about 3½ years
25	FOOTE, A. W. Proceedings Dublin Path. Soc., Session 1871–2 Primary Encephaloid Sarcoma of Lung	M	56	L	Sick for 3 months before going to hospital. Dyspnœa and a sensation of weight across chest. Left chest gave all the signs of pleuritic effusion, chronic and receding. Slight contraction of that side of chest. Heart not displaced. Intense pericardial friction. No enlarged glands, no pain, no hæmoptysis; much cachexia. Death from hemiplegia 7 weeks after admission
26	FRASER, Edinburgh Med. Jour. 1880–1881, XXVI, 577–673	F	39	L	Pain in right hip and right shoulder. Dyspnœa and cough. Effusion in left pleura. Bronchitis; dilatation of veins over left chest. Secondary tumors around left clavicle and right humerus

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
No tubercle bacilli	Entire left lung except small portion of apex occupied by large fibrous mass, involving and adhering to pericardium and heart and invading left auricle and pleura. Right lung normal except some pleurisy at base	Hard nodule in left ventricle and secondary growth involving nearly ¾ of left auricle. No other metastases	Simply stated: lympho-sarcoma	Remarkable that the man performed his duties as a soldier until 5 or 6 days before his death
Bloody; hæmoptysis	Entire left lung occupied by tumor	None, not even in pleura	Spindle celled sarcoma	
None	Heart and pericardium firmly adherent. Neoplasm filling almost entire left chest. Tumor on surface of chest communicates directly with tumor of lung. Bronchiectatic cavities and occluded bronchi	Bronchial, mediastinal, axillary lymph nodes, liver	Lympho-sarcoma	
No details	Entire left lung infiltrated with neoplasm, bounded by a mass of compressed lung tissue. Only tube through mass is pulmonary artery, which is much compressed; bronchi and pulmonary veins not distinguishable	None	Round celled sarcoma	
Copious, often bloody	Left lung entirely solid; large tumor in centre reaching surface at 3rd and 4th ribs posteriorly	Bronchial and cervical lymph nodes, left shoulder, right humerus, right hip	Small round celled sarcoma	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
27	FUCHS, Diss. München Beiträge zur Kenntniss der primären Geschwulstbildungen in der Lunge	F	70	R	No clinical history
28	Loc. cit.	M	73	R	Marked cachexia; senile bronchitis; some vomiting after deglutition which improves. Death without symptoms pointing to lungs
29	Loc. cit.	M	74	L	Clinical symptoms mainly cerebral and psychic; with the exception of some emphysema nothing abnormal found in lungs
30	HAGENBACH, 1882 (after Roth)	M	10½ yrs.	R	Treated for right pleurisy for about 7 weeks; diagnosed later as encapsulated empyema of right upper lobe increasing in extent. Increasing dyspnœa; cyanosis. Absolute flatness over right apex in front to 3rd rib; behind to angle of scapula. No fremitus, diminished respiration, sibilant rales. Right clavicle protrudes, as also supraclavicular space, where there is absolute flatness. 3 probatory punctures in region of flatness draw blood but no pus. Diagnosis of tumor of right upper lobe made during life
31	HARRIS, St. Bartholomew's Hosp. Reports, Vol. 28, 1892, p. 73 Intrathoracic Growths	M	24	L	Cough, pain in right shoulder, dyspnœa. Left chest more prominent; deficient respiratory movement; diminished vocal resonance; bronchial respiration. Complete flatness of entire left chest extending over sternum to right. Four tappings without relief. Duration about 6 months
32	Loc. cit.	M	53	R	Pain, weakness, cough. Dulness at right apex; impaired resonance over whole of right chest; diminished voice and breathing; some rales. Duration about 4 months
33	Loc. cit.	M	36	L	Pain both sides of chest; cough, slight hæmoptysis. Flatness of left chest; absence of voice and breathing. Duration about 3 months
34	Loc. cit.	F	48	L	Cough, pain in left side, swelling of abdomen. Absolute flatness with absence of voice and breathing over entire left chest. Duration about 10 months

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
No details	Primary sarcoma with central softening in right upper lobe.	Bronchial lymph nodes, liver, pancreas	Not given	
None	Nodulated tumor size of a child's head enclosed in thick fibrous capsule, in right lower lobe	Nodule in left lower lobe	Spindle celled sarcoma	
None	Nodule size of a pea in left upper lobe	None	Structure in some parts lympho-sarcoma, in others fibro-sarcoma	
No details	Medullary sarcoma of right upper lobe extending to ribs and vertebræ. Tumor size of child's head displaces right subclavian artery upward, right bronchus downward	Pleura	Round celled sarcoma	
Scant	Left lung infiltrated by soft neoplasm involving bronchial lymph nodes, œsophagus, and destroying and obliterating left main bronchus	Regionary lymph nodes, lung, pericardium	Sarcoma	
Scant, mucopurulent; no blood	Upper right lobe completely infiltrated with neoplasm, white, firm and solid in upper portion; soft and decomposed in lower portion	Small nodules in right lung, no others	Small round celled fibrosarcoma	
Scant, slight hæmoptysis	Upper lobe of left lung almost entirely occupied by new growth; lower lobe completely invaded by tumor	Right lung, bronchial and mediastinal lymph nodes	Round and spindle celled sarcoma with excessive fibrous tissue	
Scant, no hæmoptysis	Lower lobe of left lung completely occupied by hard, white tumor. Pleura enormously thickened and honeycombed	Liver, spleen, pancreas, peritoneum, and retroperitoneal glands	Sarcoma	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
35	HELLENDALL, Zeitschr. f. Klin. Med. XXXVII, 1899, p. 435 Ein Beitrag zur Diagnostik der Lungengeschwülste	M	47	R	No heredity; dry cough, dyspnœa; pain in chest. Increasing dulness from right apex downward. Varying physical signs. Later œdœma of legs and right arm. Dyspnœa dysphagia, ascites. Dilated superficial veins. Large hard liver. Bloody effusion in right chest. Clinical diagnosis at first tuberculosis, but examination of white particles in bloody effusion showed *heaps of round cells* from which the *diagnosis of sarcoma of lung was made.* Duration of disease about 6 years
36	HILDEBRAND, Diss. Berlin, 1887 (after Pollak) Primäres rundzellen Sarkom der linken Lunge im Anschluss an Lungentuberkulose	F	46	L	Acute onset with pneumonic symptoms; since then emaciation, dizziness, cough; severe dyspnœa. Duration of disease about 1 year
37	HOOPER, Intercolonial Med. Jour. of Australasia, Vol. III, 1898, p. 222 Sarcoma of Lung	M	24	R	No heredity; always well; disease commences with area of dry pleurisy. Fever to 102, persistent dry cough; great debility, dyspnœa. 2700 c.c. clear serum removed by aspiration from right chest. Area of dulness anteriorly over middle of right lung with normal breathing and voice sounds. Tumor was diagnosed from sweating, cough, emaciation. Œdœma of right face, chest, and arm. Death from asphyxia. Duration about 6 weeks
38	ISCOVESCO, Bull. de la Soc. Anat. de Paris, 1888, p. 182 Sarcome pulmonaire simulant la Phthisie	M	Not stated	R	No heredity. Pain in right chest; much cough. Signs of consolidation of left apex and patient went through all the clinical stages of phthisis — night sweats, hæmoptysis, some œdœma of face; slight albuminuria
39	JANSSEN, Diss. Berlin, 1879 Ein Fall von Lungensarkom mit grassgrünem Auswurf	M	30	Both	No heredity. History of lues. Pain in right chest, dyspnœa, cachexia Later painful enlargement of inguinal glands. Attack of pneumonia with crisis. After this progressive dulness with friction sounds, some of which also appeared on left chest. Antisyphilitic treatment shows apparent improvement; nevertheless dulness increases and cachexia progresses. Duration a little over 1 year
40	KOBYLINSKI, Diss. Greifswald, 1904 Über primäre Sarkome in der Lunge	F	20	L	No heredity. 8 weeks ago attack of scarlet fever. 2 weeks ago suddenly cough, pain in chest. Slight paralysis first of foot, then ascending. 6 days before admission last volun-

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
Occasionally bloody, contains no tubercle bacilli, several abundant hæmoptyses	Large tumor in right lung covered with thickened pleura. Lung compressed, in parts cystic	Only in liver, no others	Typical round celled sarcoma	
Mucoid, numerous tubercle bacilli	Pulmonary phthisis. Extensive sarcomatous proliferation in left main bronchus with ulceration of bronchial wall. Large nodular, hard tumor at left hilus compressing right and left main bronchus	*Absolutely none*	Small round celled sarcoma invading a previously tubercular lung. Origin not to be determined	
Bloody; no tumor elements; no tubercle bacilli	Right pleural cavity obliterated. Whole right lung infiltrated with new growth, soft and whitish — "evidently a rapidly growing round celled sarcoma"	None	No details given	The rapidity of development in this case is remarkable. Hooper had known the patient well for 10 years. Death ensued in 6 weeks from time of onset
Scant, hæmoptysis, nothing said about tubercle bacilli	Two large tubercular cavities in right lung; sarcomatous nodules in right pleura. Right lower lobe sarcomatous infiltration. Tubercles in left lung	Right kidney and œsophagus	Not given	Some doubt as to primary site of tumor. Possibly primary in kidney
Grass green color	Right lung filled with connecting tumor nodules. Tumor in middle of otherwise normal left lung. Abscess anterior mediastinum over trachea	Mediastinal and bronchial lymph nodes, spleen, pancreas, hilus of both kidneys, retroperitoneal, axillary and inguinal lymph nodes	Round celled sarcoma	
Mucopurulent, no tubercle bacilli, no blood	Left lung adherent; clear serum in pericardium. Large solid tumor size of a man's head in left lower lobe almost entirely replacing	Spinal cord	Spindle celled sarcoma	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
					tary urination; 5 days before, last fæcal movement; within last few days paralysis up to horizontal mammillary line. No sensation in paralysed parts; no œdœma; no glands. Dulness with absent breathing over greater part of left chest behind. Some pleuritic friction; bronchial respiration anteriorly. Heart displaced to right. Probatory aspiration some turbid bloody fluid. Hæmaturia. Fluid in chest present only in thin layers; most of the dulness due to solid mass in lung. Duration a little more than 1 month
41	KRENITZ, WALTER Diss. Halle, 1903 Adenoma der Lunge	M	18	L	Pain in chest, increasing dyspnœa, palpitation. Flatness over whole of left chest. Heart displaced to right
		M	38	R	Pain in right chest. Dulness below right clavicle; diminished voice and almost absent breathing sounds. Clinical diagnosis of lympho-sarcoma made from particle of tissue withdrawn by needle at time of puncture. Later fever, increasing dulness and dislocation of heart, enlargement of liver; dyspnœa; swelling of cervical and

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
	lung tissue. Involves costal pleura and penetrates intercostal muscles; involves also lower part upper lobe. Tumor penetrates through vertebral column and fills canal from 4th to 6th vertebra. Does not penetrate dura, but compresses cord. Above and below compression extensive softening of medulla spinalis			
No details	Large tumor weighing 20 kilos filling whole of left chest and extending to right, pushing heart to axillary line. Left lung compressed to small strip between tumor and chest wall. On section soft white tumor tissue containing numerous cystic cavities and areas of ossifying and ossified tissue	Enormous masses of fibrous tissue in some places having the character of soft medullary sarcoma. Areas of hyaline cartilage. The small cysts have a glandular character, lined with cylindrical cells	Fibro-chondro-adenoma with sarcomatous degeneration	
No blood, no tubercle bacilli, no elastic fibres	Large tumor in anterior mediastinum continuous with tumor of right lung. Tumor affects several large bronchi. In upper right lobe a fresh pneumonia	Right axillary lymph nodes, liver, cervical, supra- and infraclavicular glands with pressure on vagus and sympathetic	Sarcoma-carcinomatodes	
Scant, mucoid	"Encapsulated fibro-sarcoma in left lower lobe" as large as a small cocoanut. Small abscess around tumor	None	No details	
No details	No details	No details	No details	

No.	Author	Sex	Age	Duration of Illness	Clinical Symptoms
46	Lemoyne. Presse méd. Wochschr. 1909. No. 31 & 32. Primäres Lungensarkom in Rückenmarkform	F	3	2	No sensory. Sudden cough and right lower lip weak 3 weeks. Hemiparesis and cramping rest of left arm; mild weak after it. Pain, dyspnea, right fever, increasing cough. Puncture 1 cc milk, much blood; but tumorous in root near sternum, some weak. Some temporary improvement. 2 attempts to hospital, vomits, no fever, left thorax more voluminous than right, lags in respiration; harmon over all of left chest & front and behind to about 7th rib with absent sensory. Right lung normal. Notwithstanding the massive lesions, respiration much diminished and some vocal fremitus & resonance all over the flat portion. No glands; other organs normal. Increasing signs of compression — intense dyspnea, cough, anemia, filiform pulse. No cyanosis. Hemoglobin 65–70; reds 4,830,000; whites 16,000. Polynuclears 70.4%. X-ray shows tumor in lower boundary of lung and erosion of 4th rib. Another puncture of tumor brings out blood and a piece of tissue from which the diagnosis of round-cell sarcoma was made. Death after about 5 months of sickness
47	Lenoir. Diss. Erlangen, 1901 (after Pollak). Primäres Rundzellen	F	46	3	Lateral symptoms prominent. Flatness right middle and lower lobes. Hemorrhages fluid in right chest
47	Lenoir. Diss. Erlangen, 1901 (after Pollak). Primäres Rundzellen	M	Not stated (adult)	L.	No clinical history

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
No details	Left lung entirely compressed and pushed downward and backward. Sarcoma originating from tip of left lower lobe, compressing lung and displacing heart and mediastinum to right. Tumor is encapsulated and centre degenerated and necrotic. Erosion of 6th rib	None, not even regional glands	Small round celled sarcoma, probably congenital	
Nothing characteristic	No details	No details	No details	
No details	At hilus of left lower lobe an irregular grayish red nodulated mass. Pleura over 2 c.c. thick, containing numerous abscesses. The tumor is found loosely adherent to the walls of many smaller and larger bronchi and bronchiectases	No details	Small round celled sarcoma	Origin not to be determined
No details	Large soft sarcoma of left hilus. Numerous nodules throughout lung. Proliferation into pulmonary veins, obstructing them. Tumor fills and obstructs numerous bronchi	No details	Round celled sarcoma	
None, no hæmoptysis	Nothing left of lung except thin layer of lung tissue at diaphragmatic portion of tumor	Nodules in right lung, other organs healthy	Not given	

[redacted]

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
No details	Right lung adherent to chest wall and seat of extensive new growth. No other organs involved	None	Alveolar structure. Small round celledsarcoma with numerous lymph elements. Lympho-sarcoma	
Mucopurulent, often bloody	Firm, whitish-gray tumor occupying right upper lobe, partly broken down and eroding clavicle and ribs. No glands	None	Fibrous stroma; cells of varying size and shape; where tumor is hard stroma predominates, where it is soft and medullary, almost entirely cellular. Author calls it sarcoma	
No details	Bulky tumor at root of left lung extending into lung and centred around main bronchus, the walls of which are incorporated in the tumor. Large hæmorrhagic cavity in right corona radiata	No details	Small round celled sarcoma	
Bloody	Large, diffuse, nodulated tumor left lower lobe designated at autopsy as primary carcinoma	Liver, brain, peribronchial lymph nodes	Alveolar structure with thick bands of fibrous tissue arranged in meshes; extremely fine reticuli in meshes, which	Origin probably in lymph nodes

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
54	MILIAN ET BERNARD, Bull. de la Soc. Anat. de Paris, 1898, p. 320. Sarcome aigu du Poumon; Généralisation. Bactéries dans les tumeurs	F	27	L	No heredity; no syphilis. 4 months before admission while in perfect health, sudden pain and paresis of both legs. Later an attack of pneumonia. Since then cough, dyspnœa, some congestion and rales at both bases; cyanosis; high fever; paralytic and spine symptoms. Clinical diagnosis varied; last tuberculosis. Duration about 4 months
55	MILIAN ET MANTE, Soc. Anat. de Paris, Vol. 76, 1901, p. 82 Sarcome primitif du Poumon	M	31	R	History of syphilis. Admitted for brain symptoms. One year previously had severe bronchitis; since then some cough, dyspnœa, emaciation, fine rales over both bases. Clinical diagnosis: syphilitic hemiplegia. Subcomatose state; apoplectic attack, increasing fever. Death about 1 week after admission
56	MIRINESCU ET BARONCEA, Revue mens. des Malad. de l'enfance, Paris, 1894, XII, 82–	F	14	R	Uncle died of cancer. 3 months before admission acute disease, probably pneumonia. Acute symptoms improved, but general condition remained bad. On admission [illegible]

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
			are filled with small round cells. Alveolar round celled sarcoma	
Green, profuse hæmoptysis	Left lung almost entirely transformed into large cavity, the walls of which are lined with whitish-gray neoplasm; cavity contains white liquid. Also tumor surrounding 5th and 6th ribs	Mediastinal and hilus lymph nodes; bodies of 2nd and 3rd vertebræ invaded by tumor extending into canal and compressing cord	Small round celled sarcoma in part resembling lymphosarcoma; large round cells also. Sarcomatous lymphangitis	
No details	Irregular tumor near hilus of left lung; showed some fluctuation and on incision seemed composed of a number of cavities with soft walls filled with thick, creamy greenish fluid. In right lower lobe a solid tumor size of a large orange, surrounded by a series of cavities containing a purulent, viscid, greenish or chocolate colored fluid, which can in some places be lifted by the fingers in strings the size of a penholder. Atelectatic lung tissue around the tumor traversed by whitish bands	Anterior mediastinum, spleen. In brain a multitude of small cavities filled with greenish or chocolate colored pus. All other organs healthy	Sarcoma	
Mucus, bloody at first. Nothing characteristic	Right pleura almost obliterated; slight yellow effusion in left. Right visceral pleura everywhere studded with nodules, whitish yellow. Nearly whole of right lung occupied by soft pulpy tumors; in the centre a large cavity formed by degenerated tumor and filled with puriform material. All other organs healthy	Mediastinal and bronchial glands	Round and spindle celled sarcoma originating from connective tissue of septa and alveoles	
No details	Both lungs from root to base and more anteriorly	Bronchial glands	Small round and	

No.	Author	Sex	Age	Side affected	Clinical observations
	Soc. Milan. 1875. Fa. III. p. [illegible]				history unknown; could not be examined. Death from exhaustion.
[illegible] Mayer. Comm. 1881. II. p. 479	M	21	L.		Duration 4 months. Signs of pneumonia in lower lobe of left lung; pleurisy; effusion; cough; dyspnoea; fever. Examination of the abdominal
[illegible] Pic. I. Journal for Wissenschaftliche Medicin. 1881. Vienna. 1881. p. 545 Lymphosarcoma der Lunge	M	35	R.		Had until 3 months ago. Suddenly severe pain in stomach, headache, vomiting, diarrhoea, unconsciousness, lasting 1 hr 4 days or a week, not coming in spontaneous convulsions. Pain in left chest, ago and four, since yesterday; pain all over abdomen. Long vomiting after almost every meal; then pain in right chest and about heart; some dyspnoea. No vomiting for 3 months, but all other complaints worse. On admission jaundice, some cyanosis; dulness from 3rd rib downwards, merging into heart dulness; dulness posteriorly. Diminished fremitus and breathing. Dilated veins over abdomen; liver enlarged and tender. Increasing dulness over both lungs. Systolic murmur; accentuated 2nd sound. Apex beat to left of mammillary line. Aspiration of both pleurae withdrew bloody serum. Death 2 days after admission. Nothing said about cough or sputum.
[illegible] Pater et Rivet. Arch. de méd. expérimentale et d'anatomie path. Vol. XVIII.	M	26	Both		Illness commenced with cough and loss of weight. Gradual swelling of numerous peripheral lymph nodes. On admission harassing cough with

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
	than posteriorly transformed into soft pinkish tumor adherent to pleura and diaphragm. Upper portion of both lungs interstitial fibrosis	enlarged; in part cheesy and calcareous	spindle celled sarcoma. Pigment and connective tissue induration of rest of lung	
No details	Nearly entire upper portion of left lung replaced by whitish tumor	Pleura, right lung, mediastinal and inguinal lymph nodes	Round and spindle celled sarcoma	
No details	Right lower and middle lobes replaced by tumor larger than child s head with only a trace of compressed lung tissue remaining at its periphery. The greater part of the tumor is hard; some places soft on section with round pigmented areas corresponding to bronchial glands, also here and there the lumen of a bronchus can be seen	Both auricles, pericardium; head of pancreas, retroperitoneal lymph nodes; compression of lower cava by tumor	No details	
No details	Numerous tumor nodules at both bases; more in left	Mediastinal mesenteric, peripheral lymph nodes; nodes at hilus of liver	Large round celled sarcoma	Author claims origin from intra-alveolar tissue at left base. Numerous nodules in liver shown to be tubercular, containing bacilli
Occasionally bloody	Lympho-sarcoma of left lung, bronchi, pleura, and mediastinum. Bronchiectases, purulent bronchitis, indurative pneumonia of left lung; œdœma of right lung. Degeneration of left recurrent; myo- and endocarditis	Bronchial, cervical, axillary lymph nodes; left auricle	Lympho-sarcoma	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
62	Loc. cit.	M	53	R	No heredity. After some gastric disturbance anorexia, cough, pain in chest, night sweats, dyspnœa. Diminished respiratory motion over right chest; posteriorly, flatness and diminished voice and breathing. Aspiration: bloody serum. Tumor appears over right clavicle. Right chest becomes retracted; stridorous respiration; club fingers. Aspirating needle now enters hard, firm tissue. Duration about 1 year
63	Pitot, Arch. de Méd. et de Pharm. Mil., Vol. 34, Paris, 1899, p. 306 Sarcome primitif du Poumon a Marche rapide	M	20	L	Tubercular family history. Always well. Cough since a month before admission. Looks well. On both lungs sonorous and sibilant rales. No dulness anywhere. No lesions in other organs. Diagnosis: bronchitis and grippe, which was then epidemic. No fever. Some weeks later dyspnœa; slight dulness middle of left lung behind. Dulness increases towards apex. Severe pain at left base. Later pleural effusion, heart displaced to right; fever. 800 c.c. of bloody serum aspirated. Patient feels better but physical signs persist. Diagnosis: tuberculosis. Repeated aspirations. Dulness increases in front and behind. Left chest measures 2 cm more than right. 900 c.c. greenish fluid aspirated. Left jugular thrombosed; œdœma of that side of face, neck, and shoulder. 2 more aspirations without result. Thrombosis popliteal vein. Death with intense dyspnœa and suffocation about 2½ months after admission
64	Poison et Robin, Gaz. méd. de Paris, 1856, No. 9 Quoted (from Fuchs) Tumor Fibroplastique du Poumon	M	30	L	Cough, night sweats, dyspnœa, pain in left chest, emaciation. Later pleurisy and signs of consolidation of left lung; cyanosis; intense asphyxia. Duration about 6 months or over
65	Polacci e La Franca, Arch. Ital. de Med. Intern., Palermo, 1901, Vol. IV, fasc. 1–2, p. 408 Enorme Sarcoma primitivo del Polmone con sintomi di pseudo-mixedema	F	55	R	Disease began with swelling of right carotid, which gradually invaded right side of neck and upper part right chest; later left side also involved. Increasing difficulty in breathing and swallowing, dilated veins in chest and neck. Cough, pain in chest, nocturnal attacks of dyspnœa, œdœma of lower extremities. Dulness over right chest below 3rd interspace; diminished voice and breathing; from spine of scapula downwards bronchial respiration; absence of breathing at base. Left lung normal. Duration about 9 months

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
Mucoid, no tubercle bacilli, later strawberry colored containing bronchial casts and great numbers of large round epithelial cells	Tumor degeneration of right main bronchus, somewhat in left bronchus and in trachea; at bifurcation penetrates right upper lobe from hilus along bronchi. Large bronchiectatic cavities in lower lobe	Bronchial, retrobronchial, cervical, axillary lymph nodes, skin, liver, and kidneys	Small round celled sarcoma retaining alveolar structure of lung due to persistence of septa	Origin probably from small lymph nodes within the lung
At first mucoid, later bloody, finally typical "currant-jelly," no tubercle bacilli	Left lung almost entirely replaced by large tumor everywhere adherent to costal pleura. Tumor softened in some places and resembles brain substance; in other places grayish masses traversed by bands of fibrous tissue. No enlarged glands at hilus. Veins in left neck thrombosed and merged into nodulated tumor at base	Tumor size of orange in liver with cavity in centre containing colloid material. All other organs healthy	Round celled sarcoma	
Repeated hæmoptyses	In the lumen of bronchi, on surface of lung and in lung tissue itself soft whitish encephaloid masses	No details	Spindle celled fibroplastic sarcoma	
No details	Fluid in right pleura. Heart dislocated to left. All of right lung except tip occupied by large nodulated tumor. Enlargement of right lobe of thyroid	Bronchial lymph nodes	Round celled sarcoma	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
66	POLLAK, Dis. Würzburg, 1897 Ein Fall von primärem Lungensarkom	M	71	R	Various tropical diseases. Death with symptoms of icterus gravis
67	POORE, The Lancet, London, 1895, I, p. 870 A Case of Tumor of the Lung	M	20	L	Quite healthy until one morning on getting up sudden shortness of breath. Remained in bed for some weeks. Later, while walking, severe pain in back. Went to bed and then to hospital. Slight dyspnœa on exertion, slight cough. Left side impaired respiratory motion. Below 3rd rib absolute dulness. Absence of voice and breathing over this area; some bronchial breathing; similar conditions below. Heart dislocated to right. Aspiration negative. Left chest increased in size; swelling in left mammary region; slight fever. Later œdœma of left chest; dilated veins. Small tumor over head of right humerus. Dulness extended over to right chest. No pain at any time. Duration about 4 months
68	PORTER, British Med. Jour., 1885, II, 448	M	39	L	Dyspnœa, palpitation, cough. Pain, dysphagia. Œdœma feet and left forearm. Flatness upper left lung; dulness at base; feeble voice and breathing
69	POWELL, Brit. Med. Jour. 1879, p. 115 Sarcomatous Disease invading the Lung and Occluding its Bronchi	M	Not stated	R	Hæmoptysis of 2 weeks duration. Cough and hæmoptysis recurred few months later. Jaundice. Dulness at base to spine of scapula and nipple with diminished voice and breathing, later extending over upper lobe. Pain in chest; intense dyspnœa
70	RANGLARET, Bull. Soc. Anat. de Paris, 1893, Vol. VII, p. 591 Sarcome primitif du Poumon Gauche	F	34	L	No heredity. Pain in left chest. Pregnancy; normal labor. Continued pain; negative puncture. Later expansion of left chest. Flatness and absence of breathing sounds all over chest. Harassing cough. Dislocation of heart to right. Debility and emaciation. Dilatation of superficial veins. Œdœma of lower extremities. Bloody fluid in left pleura. Diagnosis made during life. Duration about 16 months
71	REYMOND, E. Bull. de la Soc. Anat.	M	23	L	Sudden onset after "cold" with dyspnœa, severe pains in left shoulder

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
No details	From root of right lung and extending along bronchial ramifications, medullary infiltration, particularly of the alveolar septa; compression of bronchi and blood vessels	Liver and lymph nodes of lig. hepatoduodenale	Round celled sarcoma proliferating mainly in the fibrous tissue of the intralobular and intra-alveolar septa of the smaller bronchi	
Scant, once or twice bloody	Whole of left chest filled with soft growth covered by thickened pleura firmly adherent to chest wall. Upper anterior portion of tumor covered by shell of collapsed lung	Right lung, mediastinal lymph nodes, liver and over humerus and scapula	Round celled sarcoma	
Bloody	Large tumor occupying entire left upper lobe, and enveloping root, transverse aorta, left carotid and subclavian. Pneumonia in lower lobe	No details	Round celled sarcoma	
Mostly bloody	Large lymphomatous growth in posterior mediastinum occupying bifurcation and extending into lung, involving two lower bronchi and completely occluding the lower one. Middle lobe entirely occupied by tumor. Bronchiectases in lower lobe	Liver, left kidney and peritoneal lymph glands	Lympho-sarcoma	
Mucoid and bloody, hæmoptysis	Left lung totally replaced by soft encephaloid tumor with cavities containing bloody and greenish contents. Right lung normal	Absolutely none anywhere	Spindle celled sarcoma	
Bloody, no tubercle	Nearly whole of left lung converted into large tumor	Glands at hilus only	Spindle celled sarcoma; no	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
	de Paris, 1893, Vol. VIII, p. 256 Sarcome primitif du Poumon Gauche				radiating into arm and fingers. Improved for a time, but symptoms re-appeared with loss of flesh and hæmoptysis. Examination then showed nothing but slight pericardial friction. Clinical diagnosis at that time: rheumatism with dry pericarditis. Later increasing pain, slight fever. Bulging of left chest; heart dislocated to right. Flatness from left clavicle downwards; diminution of breathing sounds. Repeated cultures negative. Heart sounds heard clearly all over left chest. Blood normal. Fever up to 104. Duration about 5 months
72	ROLLESTON, H. D. Transact. Path. Soc. of London, 1891, p. 54 Myxo-sarcoma of Lung	M	33	L	No clinical history except that paracentesis of thorax gave mucous fluid
73	ROLLESTON & TREVOR, British Med. Jour., Feb. 14, 1903 Primary Sarcoma of the Lung	F	13	R	Recurrent pains in right chest and all symptoms of empyema. Aspiration at first negative; later small amount of bloody fluid. Resection of rib showed solid growth
74	ROTH, LUDWIG, Diss. München, 1904 Über primäres Lungensarkom, etc.	M	45	R	Always well. December, 1902, pain in chest and cough. Got better, but had renewed attack in Jan., 1903. Never quite well since then. In beginning of May, 1903, severe pain in chest and back; impossible to walk upright. While walking sudden feeling as if something burst in his abdomen. Signs of paralysis after that. On admission 10th to 12th thoracic vertebræ very tender; to the left of their spines a fluctuating tumor presents size of the palm of the hand. Flatness over entire right apex. Rales over both lungs. Clinical diagnosis: tuberculosis of lungs and spine. Later puncture of abscess. Rapid decline, intense dyspnœa. Pains in both legs; emaciation; death
75	RUETIMEYER, Corresp.-blatt für Schweizer Arzte, 1886, XVI, 169–199	F	28	L	No heredity. Sudden onset with pain in side and moderate fever. Pain disappears; some dyspnœa remains; dry cough. Chills and fever; dulness over left base. Exploratory puncture

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
bacilli	filling greater part of chest. Some remnants of lung tissue under pleura. Cavity in centre of tumor contains large amount of fresh blood		remnants of pulmonary structure	
No details	Left lower lobe completely occupied by a mass of new growth almost completely replacing lung tissue. Upper lobe compressed and infiltrated with new growth in its lower parts. Parts of the tumor calcified; honeycombed in parts with cysts containing gum-like fluid consisting chemically of albumin and mucin. The tumor projects into pericardial cavity	Bronchial glands; 8th, 9th and 10th left ribs	Small celled myxosarcoma	
No details	Whole right lung except apex converted into soft gruel-like growth with hæmorrhagic areas	None	Spindle celled sarcoma	
Bloody several weeks before death	Right lung adherent. Neoplasm size of a fist in right upper lobe. Pneumonic infiltration of lower lobe. Bronchi infiltrated with tumor. Tumor almost completely replaces lung tissue	Peribronchial glands	Alveolar structure; stroma of fibrous strands containing dilated and congested blood vessels. Tumor consists of small round cells with large nuclei and small protoplasmatic bodies. Walls of alveoles lined with similar cells. Large areas of tumor necrotic	Author designates the tumor as a small round celled sarcoma probably originating in lung itself
Green, later severe hæmoptysis	Whole left lower lobe practically one large tumor surrounded by thin layer of compressed lung tissue. Bronchi normal	None anywhere	Small round and spindle celled sarcoma	Origin from lung tissue itself

No.	Author	Sex	Age	Lobes Involved	Clinical Symptoms
					negative. Later hemoptysis with sputum of rust and resulting over all lung. Clinical diagnosis: tuberculosis or pyemia. Bile reaction. Slowest sed. reaction. Tumor masses in lung. Duration about 2 years
76	Rumpel, Ztschr. f. klin. Med. 3 Kongr. f. innere Med. (Verhandlungen des Kongresses für innere Medizin)	M	45	Both	Increasing dyspnea.
77	Lee, cit.	M	41	R	Clinical diagnosis: right pleurisy with effusion. Aspiration negative. Increasing cough, dyspnea, dysphagia. Dullness in supraspinous interval, raising
78	Schmidt, Virch. Arch. f. klin. Med., Vol. 47, 1891, p. 411 Das primäre Lungensarkom	M	57	R	Acute onset with profuse hemoptysis. Nothing found on lungs. Repeated severe hemoptyses. Year and half later slight dulness, diminished fremitus and absence of breathing over right base. Some rales. Embolism was suspected. No dyspnea, fever, pain, or emaciation. Repeated hemorrhages. Year later dyspnea, intense pain, cough. Gradually complete paralysis up to mammillary line. Increase of dulness over entire right chest. Duration of disease at least 3 years
79	Schmidt, Diss. Greifswald 1900	M	36	R	3 weeks before admission bloody sputum and pain in right chest. In-

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
No details	Numerous nodules in both lungs, more in right, often confluent and merging into large masses	No details	Round celled sarcoma with calcification	
No details	Old tuberculosis of left apex; numerous larger and smaller nodules throughout right lung, also strips of infiltration of white tumor throughout lung. Tumor proliferates into wall of œsophagus. Tumor masses surround and compress descending aorta, œsophagus, both bronchi, and right auricle	Bronchial and mediastinal lymph nodes and œsophagus	Round celled fibro-sarcoma	
Purulent, *green*	Bloody fluid in right pleura. Almost entire right lung converted into firm white tumor mass enclosing cavities filled with necrotic material. Left lung normal	Spleen; pleura. Brain and cord not examined	Round celled fibro-sarcoma	
Profuse, muco-purulent, occasionally bloody; contains tubercle bacilli	Fresh endocarditis. Tuberculosis of both lungs. In right middle lobe a large tumor, encapsulated and containing a cavity filled with degenerated tumor material; in part chalky degeneration; numerous tubercle bacilli	None	Typical spindle celled sarcoma	
No details	Left chest entirely occupied by tumor of left lung displacing heart and compressing right lung	Diaphragm and spleen	Small round celled sarcoma	Origin from bronchial glands
Tenacious, bloody,	Bloody fluid in left pleura. Nearly whole of left lung	No details	No details	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
	della cliniche Milana, XXIII, 1902, seria 11, p. 1236 Sul Sarcoma primario del Pulmone				swallowing. For 1 month icterus and milk diet. For 5 months severe cough; no fever. Some nausea, but rarely vomiting. Severe pain in epigastrium and behind sternum radiating to left chest and shoulder. On admission much emaciation. Impaired respiratory motion of left chest; flatness over whole left chest except slight space at base. All over flat area absence of breathing and fremitus. Œsophageal sound finds resistance 32 cm. from teeth. Puncture yields only a few drops of blood; needle enters hard, firm tumor mass. Gradual decline; intensest dyspnœa, cyanosis. Slight fever. Clinical diagnosis: primary sarcoma of lung
82	SMITH, W. G. Dublin Jour. Med. Science, 1881, Vol. 72, p. 452	M	Not stated	R	Pleurisy of right side 2½ years before. Since then never quite himself; breathing always short. Later principally cerebral symptoms, paralysis, etc., due to hæmorrhage and softening in pons. 4 or 5 weeks before death hæmoptysis, cough. Dulness below right clavicle extending downwards; complete absence of breathing sounds. Later temperature to 102. Later complete dulness of entire right chest. Excessive sweating; fœtid breath. Duration of illness from development of paralysis, 3 months
83	SPILLMANN AND HAUSHALTER, Gaz. Hebd., 1891, p. 587 Du Diagnostic des Tumeurs malignes du Poumon	M	42	L	Occasional pain in left chest; bulging of entire left chest. Irregular areas of dulness increasing to flatness; absence of voice and breathing. Emaciation and sweating. Various symptoms referable to the heart. No dyspnœa; no cough. Duration of disease about 2 years
84	STEELL, GRAHAM, Lancet, 1894, I. p. 388, Clinical Lecture on Case of Tumor of Lung	M	45	R	Good health until hæmoptysis, followed by failure of health. No cough, no expectoration, and no physical signs on lungs for months. Later much pain in right chest and large quantities of putrid expectoration as from cavities. Upper right chest fuller than left; impaired respiratory motion. Absolute flatness of upper right lobe with later development of tympanitic sounds and other signs of cavity. Dilatation of veins of upper right arm and right chest. Slight temperature shortly before death
85	SUTTON, Lancet, 1869, I, p. 459	F	11	L	Cyanosis, dyspnœa. Absolute flatness and absence of breathing sounds throughout left chest. Heart dis-

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
no tubercle bacilli	transformed into hard, dark, greenish tumor mass			
Repeated hæmoptysis	Right lung adherent. Encapsulated empyema with putrid pus. Upper ⅔ of lung converted into lobulated tumor separated by highly pigmented septa. Lower third completely gangrenous	Mediastinal lymph nodes	Small round celled sarcoma	
None	Large tumor filling nearly all of left chest dislocating heart to right and pushing diaphragm downward. Origin of tumor right upper lobe. Peripheral areas of tumor surround a cyst-like central mass; entire central mass surrounded by compressed lung tissue	None	Cystic fibro-sarcoma	
None at first, later abundant, extremely fœtid. No microscopic examination	Both pleuræ adherent. Right pleura practically obliterated; no effusion. Large cavity in right upper lobe with irregular soft walls of grayish-white tumor. Tumor size of a small orange projects into cavity. Only slight traces of lung tissue remain in upper lobe	None; not even in middle and lower right lobe	Simply said to be lympho-sarcoma	
No details	Medullary cancer occupying entire left chest. "Left lung collapsed, pushed back-	None	No details	

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
	wards and spread out over cancerous mass "			
Purulent, often bloody, no tubercle bacilli	Scar infiltrated with tumor and adherent to right lung. Whole right lung replaced almost entirely by soft yellowish tumor. Lung tissue compressed and studded with tumor nodules. In centre a cavity containing blood and detritus	Bronchial glands and resected ribs	Operated tumor shows: alveolar structure; small round celled sarcoma with mucoid degeneration; no epithelial or giant cells	After careful search and study of all other organs, tumor was pronounced primary in lung
No details	Entire left lung transformed into firm tumor adherent to chest wall	Bronchial lymph nodes, pericardium, right lung, liver	Medullary sarcoma	
Repeated hæmoptyses, no tubercle bacilli	Both lungs studded with sarcoma nodules, especially left upper lobe, surrounding bronchi and proliferating into their lumen	Various lymph nodes, liver		
Several hæmoptyses	Left bronchus completely surrounded and obstructed	Left recurrent laryn-	Round celled sarcoma	Doubtful if primary in lung

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
	Path. Soc., Vol. 44, 1893, p. 14				tion: bloody fluid from left pleura. Dilated veins over left chest. Heart dulness extended to right. Difference in pupils. Duration of disease about 9 months
90	WILKS, Trans. London Path. Soc., Vol. IX, 1857, p. 31 Fibrocellular Growth of the Lung	M	46	L	Dyspnœa, dulness over left chest. Dropsy

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
	by tumor; infiltration of left upper lobe; portion of lung gangrenous. Tumor communicates with small growth behind left sternocleido muscle. Compression of pulmonary artery, veins, and aorta by tumor. Aorta and œsophagus ulcerated and perforated by gangrene	geal nerve		
o details	Tumor occupied nearly whole of left chest, destroying lower part, compressing upper of lung. Root not affected but adherent to chest wall	Posterior mediastinal glands	Fibro-sarcoma, long nucleated fibres with nucleated cells interspersed, in some parts very rich in round cells	Author remarks that in appearance and behavior it resembles more the non-malignant than the malignant type

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
1	ADAM, G. R. Glasgow Med. Jour., 1879, pp. 31–37	M	25	R	Pain in chest and dyspnœa for 15 months. Dulness from right apex to nipple; absence of breathing sounds
2	LOC. CIT.	F	20	L	Cough, dyspœna, pain in left chest; deficient respiration; no vocal fremitus. Dulness from clavicle to 5th rib. Left chest half inch more in circumference than right. Later aphonia and dysphagia
3	ADAMS, London Path. Soc., 1848–50, II, pp. 174–177	M	25	Both	No symptoms until 2 weeks before admission, then dyspnœa and slight cough; later cyanosis. Small tumor below right clavicle
4	ADAMI, Montreal Med. Jour., Vol. XXIV, 1895, p. 510 A Case of Malignant Intrabronchial Growth Associated with a Misleading Train of Symptoms	F	50	R	Died 4 hours after admission. One year before believed to have incipient tuberculosis of right apex. Whole right side dull; cavernous breathing above; feeble breathing below. Clubbed fingers; cyanosis
5	AVIOLAT, Thèse de Paris, 1861 Du Cancer du Poumon.	F	30	L	No heredity. Some pain, dyspnœa, increasing weakness. Brain symptoms (strabismus, headache, formication of arms, vomiting) at an early stage. Right lung normal. Dulness over left anterior chest with bronchial respiration. Later flatness with absence of voice and breathing
6	BENNETT, J. RISDON, Intrathoracic Growths London, 1872	F	36	Both	Cough, pain in left side; increasing emaciation and debility. Considerable scoliosis
7	BERNARD ET VERMOREL Bull. de la Soc. Anat. de Paris, 1894, pp. 251–253 Cancer du Poumon avec épanchement pleural sero-sanguinolent	M	44	R	No ascertainable heredity. For 6 years cough each winter with abundant expectoration. Dates sickness 4 months before admission, when increasing weakness and dyspnœa on slight exertion. On admission no marked loss of flesh; night sweats. No lesions anywhere except on lungs. Left lung

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
No expectoration, ½ ounce of blood at late stage	Cancer nodules throughout entire right lung	Glands of thorax	Not given	
White, never bloody	Upper part of left lung occupied by nodular mass extending up to thyroid, enclosing aorta and roots of cervical vessels. Heart displaced to middle line	Lymph nodes of neck and mediastinum; both kidneys and right suprarenal	Not given	
Scant	Both lungs studded with spherical, well demarcated tumors of all sizes. Upper cava compressed. No effusion	Bronchial and cervical lymph nodes and liver	Author calls it "Fungus hæmatodes"	
Yellowish, mucopurulent	Lobular consolidation at left base; purulent bronchitis. Right lung adherent; interstitial pneumonia of upper lobes and bronchiectasis. No signs of tuberculosis. Right lower lobe completely collapsed and adherent to diaphragm. Saccular dilatation of left main bronchus which is obstructed by large soft tumor proliferating upward into the bronchus and obstructing it	Peribronchial lymph nodes	Alveolar structure that resembles carcinoma; many cells like sarcoma	Adami is inclined to call it sarcoma
Not mentioned	Several cystic tumors in the brain. Clear serum in left pleura. Upper left lobe and its bronchi a mass of nodulated tumor	None	Not given	Possibly sarcoma
None; no hæmoptysis	Both pleuræ adherent. Right lung large; left small and misshapen on account of scoliosis. Both lungs studded with grayish white tumors. Both lungs distinct and diffuse cancerous infiltration. Lung tissue between infiltrated portions normal	Liver	No details	Author simply states that the tumor is cancer
Scant, mucopurulent; at times pink. No tubercle bacilli	Sanguinolent effusion in right pleura. Lung compressed upward. Large tumor in upper mediastinum, white and hard, extending slightly to left, but main bulk in right chest; tumor has replaced greater part of	Bronchial lymph nodes. No other metastases anywhere	Not recorded	Probably carcinoma

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
					healthy except some moist rales. Right chest immobile on respiration and all signs of pleural effusion. Aspiration, 1800 c.c. yellow serum. Dyspnœa improved but dulness remained all over upper right lung. Tumor of lung is suspected in spite of good appetite, lack of cachexia and non-characteristic sputum. Sudden attack of intense dyspnœa; probatory puncture in upper lobe seems to enter solid tumor. Œdœma of lungs. Death
8	BIERBAUM, Preuss. Vereinszeit., N. F., V, 31, 1862 (after Reinhard)	M	25	L	Pain in left hypochondrium; harassing dyspnœa; no cough. Left chest dilated; some dulness; normal auscultation. Œdœma of feet and hands
9	BOUILLAUD, Jour. comp. du Dic. des Sciences Med., 1826, Vol. 25, p. 289 Observations sur le Cancer des Poumons	F	29	L	Over 3 months in hospital but chest not examined as patient was in surgical ward. Dry cough, rapid marasmus, hectic fever. Swelling, supposed to be cancerous, of right lachrymal gland
10	BRICHETEAU, Gaz. des Hopit. de Paris, 1833, VII, p. 281 Dégénérescence squirrheuse de la presque totalité d'un Poumon etc.	M	35	L	When admitted to hospital was so weak he could not be examined. Extreme emaciation; high fever; enlarged left axillary glands. Hard tumor over left clavicle. Dulness over left chest. Clinical diagnosis: acute phthisis
11	BUDD, London Medico-Chir. Trans., 1859, Vol. XLII, p. 215 On Some of the Effects of Primary Cancerous Tumors within the Chest	M	31	R	Good health until attack of pneumonia in right lower lobe; since then short breathing; later pain in lower, right chest. Gradual loss of strength, cough, dulness and inaudible respiratory murmur over lower right chest. Later œdœma of right chest and face; enlargement of superficial veins; friction over precordial region; intense dyspnœa; purpuric spots. Enormous enlargement of veins over right chest and belly. Duration of disease about 2 years
12	LOC. CIT.	M	20	R	Always well. After a cold, pain in right chest posteriorly, later anteriorly. After a week well, then œdœmatous. Dilatation of veins of chest and epigastrium. Dyspnœa, hoarseness, cough; later vomiting. Fever, intense dyspnœa; death. Duration about 5 months

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
	right upper lobe and envelops origin of anterior mediastinum, trachea, arch of aorta, and both pneumogastrics, proliferating slightly into trachea at bifurcation. Left lung healthy			
Not mentioned	Entire left lung converted into medullary tumor except small portion at apex. Pleura adherent. Right lung displaced	Right lung and liver	Not mentioned	
Not given	Upper left lobe almost completely converted into whitish tumor. No ulceration; no cavity. "Cancerous polypi" in posterior nares	No others	Not given	Probably sarcoma
Purulent	Right lung normal. Entire left lung transformed into a hard, bluish, marbled tumor showing no remnants of pulmonary structure; no softening, no suppuration, no ulceration. Tumor adherent to pleura in upper portion. Yellow serum in pleura. All other organs normal	None	Not given	Probably sarcoma
At first scant, later bloody	Lower part of right chest occupied by a white cancerous mass; extending to mediastinum; tip on level with clavicle. Penetrates upper cava, projects into right auricle enclosing root of lung. Large bronchi penetrated by tumor and narrowed but not closed. Large bronchiectatic cavity filled with pus in upper lobe. Pericarditis	No others mentioned	No details	Doubtful whether bronchial carcinoma or sarcoma
Frothy mucus tinged with blood. Later greenish pus	Firm, nodular, yellowish white tumor in mediastinum, penetrating into right lung. Upper cava, right innominate vein and part of left involved in tumor, which also projects into pericardium. Tumor penetrates trachea ½ inch above bifurcation and down right main bronchus. Small nodule in left bronchus	Bronchial and tracheal glands	None given	Probably primary in mediastinum and sarcoma

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
13	BUDD, Loc. cit.	M	63	R	Always well. Illness commenced with cough, shortness of breath. 3 weeks before admission swelling of face; no pain. Dulness and diminished voice and breathing over greater part right chest in front. *Heart sounds are heard loud over the dull area of right chest.* Dilated veins over chest on both sides. Increasing œdœma of chest, face, and arms. Intense dyspnœa. Death from asphyxia. Duration about 7 months
14	BUREAU, Bull. de la Soc. Anat. de Paris, V, Série 10, 1896, p. 26 Tumeur de hile du Poumon droit. Pleuresie droit	F	58	R	For some years always aware of some trouble in chest. Frequent attacks of bronchitis and strong oppression on climbing or walking briskly. No palpitation, but violent pains behind sternum. Diagnosis of angina pectoris was made, for which she was treated in hospital. *Improved and for some years the attacks of pain and oppression disappeared entirely.* A few days before admission to the hospital while on train to Paris, sudden chill and violent pain in right chest. On admission flatness at the right base, loss of fremitus, faint distant breathing. All other organs normal. No cyanosis, no œdœma; no cardiac symptoms. Later slight rise of temperature. Aspiration dark yellow serum. Rapid refilling of chest. Three punctures with increasing amount of serum. Notwithstanding punctures dyspnœa increases to most intense orthopnœa. Suddenly hæmopytsis and death. Duration of the acute stage only a few months
15	BURROWS, Med. Chirurg. Trans., 1844	F	20	R	First symptoms 6 months before admission, then pain under sternum, cough and loss of appetite. Better for a time, then dyspnœa, emaciation, and sweating. Dulness on upper right chest, increasing to flatness. Feeble bronchial respiration. Œdœma of face, right hand, and arm. Duration of disease a little more than 6 months
16	CANNSTATT, Hannover. Annalen für die gesammte Heilkunde, Vol. V, 1840, p. 433 Ähren-lese aus der Praxis	M	22	L	Profuse hæmoptyses. No pain. Dulness over left chest; pectoriloquy
17	CHARTERIS, M. Lancet, 1874, I, p. 126 On Intrathoracic Cancer	M	44	Both	For 3 months hoarseness, vomiting of food and blood; loss of weight, increasing weakness. On admission cough, dyspnœa, dysphagia, persistent vomiting. Rales all over chest. Posteriorly dulness at angle of right scapula. Paralysis of left vocal cord. Death after increasing dyspnœa and weakness

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
Bloody; profuse hæmorrhage	Serous fluid in right pleura. Whole of right upper lobe converted into solid white tumor included in enormously thickened pleura. Below right main bronchus a scirrhous mass, size of a small apple invading but not constricting bronchus, compressing upper cava. Few nodules in left upper lobe	Left lung; bronchial glands	None	Origin probably in bronchial glands. Possibly sarcoma, but probably bronchial carcinoma
Hæmoptysis	Abundant fluid in right chest. White, very hard tumor at root of right lung adherent to pericardium. The lung is of the size of 2 fists, and the tumor starting from the hilus penetrates deeply into the lung tissue. Right main bronchus completely obstructed	Tracheal and bronchial lymph nodes	None given	Difficult to say whether we have to deal here with sarcoma or carcinoma. It is probably carcinoma
Hæmoptysis and currant jelly expectoration	Right chest larger than left. 2000 c.c. brown fluid in right pleura. White, lobulated tumor in lower and middle lobes. Bronchiectatic abscesses. Compression of right pulmonary veins, right carotid, and internal carotid	Cervical, axillary, and mediastinal lymph nodes	None given	Author calls the growth cancer. It is probably sarcoma
Profuse, foul, putrid. Profuse hæmoptyses	In left lung cavity larger than man's fist, the walls of which are thickened and made up of scirrhous material	Bronchial glands	Not mentioned	
Foamy, abundant	Tumor at bifurcation branching into bronchi of both lungs, especially right. Involvement and compression of œsophagus. Left recurrent laryngeal also involved	Not mentioned	Numerous round cells surrounded by vascular connective tissue	Probably sarcoma. I. A.

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
18	CLARK, A. Lancet, 1856	M	22	R	Clinical signs of pulmonary phthisis. Night sweats; diarrhœa
19	COCKLE, Association Med. Jour., London, 1854, p. 990	M	64	Both	Laryngeal cough, hoarseness, dyspnœa, dysphagia, fever. Follicular affection of throat. *No signs on lungs*
20	DE BOYER, H. Le Progres. Med., III, 1875, p. 87 Adenopathie bronchique Cancereuse	M	25	Both	Testicle removed for suppuration two years before admission; thereafter legs became swollen and painful; dyspnœa on walking; chronic bronchitis. Loss of weight and strength, hoarseness, night sweats. Examination on admission revealed a hard gland, size of a hazel nut, in left supraclavicular region. Dulness over sternum and posteriorly between scapulæ. On right side anteriorly, distinct murmur-like sounds simulating aneurysm, also faint rales. Over area corresponding to tracheal bifurcation bronchial breathing. Cough characterized by whoop. Dysphagia, aphonia, slight albuminuria. Death during an attack of dyspnœa 13 days after admission, glands having rapidly increased in size. Diagnosis: tuberculosis of bronchial glands
21	DE RENZI, La Riforma Med. Napoli, XIV, 1898, Vol. I, p. 747 Un Caso di Carcinome del Polmone	M	55	L	For 2 years cough; 8 months pain in left shoulder (patient was accustomed to carrying heavy loads on left shoulder and continued to do it notwithstanding the pain). For 3 months hoarseness, loss of strength and weight, harassing cough. On admission left supra- and infra-clavicular fossæ are abolished and bulging so that left clavicle is hardly visible. Bulging occupies nearly all of left shoulder and supraspinous region, extending down to interscapular space to left of vertebral column. Over all the swollen region dilated superficial veins, impaired respiratory motion. Dulness and diminished respiration and fremitus over all this region. Left supraclavicular, axillary, and inguinal glands enlarged. No fever. Paralysis of left recurrent laryngeal. Intense pain from left shoulder through arm. Blood examination showed very moderate secondary anæmia; no leucocytosis. All other organs healthy
22	DE VALCOURT, Revue Med., III, XVIII, 1874, 723 Press. Med. Belge, Bruxelles, 1874, Ann. 26, p. 406 Cancer pulmonaire, compression, etc.	F	25	R	Dyspnœa, cachexia, complete aphonia, cyanosis, dysphagia. Left thorax depressed, right increased in volume; dulness throughout; diminished breathing. Tracheotomy to relieve dyspnœa

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
Hæmoptysis	Tumor in upper part right lung extending into lung from periphery. Bronchi filled with cancer cells	Not mentioned	Not mentioned	Possibly sarcoma (?)
Purulent, blood-stained	Both lungs studded with nodules. Softening and cavity in upper left lobe. Superficial ulcer in larynx	Mediastinal lymph nodes	No details	Tumor is called encephaloid cancer
Foamy, mucous, streaked with blood	Both lungs medullary nodules; at base of both lungs small subpleural nodules. Bronchial glands enlarged and fill entire mediastinum, compressing aorta, thoracic duct, vena cava	Liver, retroperitoneal glands; balance mentioned under autopsy	Not given	
Scant, mucopurulent, contains no tubercle bacilli	No details given. Stated "Diagnosis confirmed"	No details	No details	
Mucoid	Enormous right lung that had dislocated heart toward left. Right lung lardaceous, semi-transparent, and hard. Compression right bronchus	Liver, tracheal and bronchial lymph nodes	Not given	Possibly sarcoma

No.	Author	Sex	Age	Lung involved	Clinical symptoms
23	[illegible] Zeitschrift für ärztliche Fortbild. für Tierzt. Gesellsch. Mitt. Berlin, 1912, 3, 256 Ein Fall von Tumor der linken Lunge	F	38	L	Always well until one month before admission, then pain in left chest, cough, dyspnoea. Impaired respiration left upper chest, merging left supraclavicular region. Left breast larger than right, small hard glands in both axillae. Tumour removed from above left clavicle, margin into heart contour, extends into axilla and posteriorly to 4th thoracic vertebra. Adhesion of touching over mid axillary line; tumour touching. X-ray shows hazy shadow over left upper lobe. Clinical diagnosis: tumour of left lung
24	Elliot. British Med. Journ., April, 1914	F	28	R	Pain in right chest; complete fatigue; absence of breathing, dyspnoea, becoming rough. Duration 7 months
25	Fraser. Trans. London Path. Soc., 1907. XVIII, pp. 29–31 Discussion: Primary Cancer of Lungs	M	58	Both	Orthopnoea, cough, debility. Dullness right interscapulary and abolished voice at base of each lung posteriorly, especially left. Oedema of legs. Sudden death
26	Fraenkel, Diss. München, Beiträge zur Kenntniss der primären Geschwulstbildungen in der Lunge	F	62	L	No clinical history
27	Loc. cit.	F	56	R	Diagnosed during life as pleurisy and later as empyema

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
Bloody, raspberry jelly; no tubercle bacilli	None	No details	Not given	Doubtful whether carcinoma or sarcoma
Green	Fluid in right pleura. Almost entire right lung converted into "cancer"	Small node in right auricle and aorta	No details	Probably sarcoma
No details	Clear brown fluid in both pleuræ. Both lungs studded with cancerous deposits resembling tubercles	Pericardium, right auricle, left ventricle, liver	No details	
No details	Clear serum in left pleura. In left upper lobe a softened, diffusely infiltrated area filled with greenish matter	None	Author says soft area is a cancerous infiltration, consisting of spindle cells and large round epithelioid cells	Possibly sarcoma
No details	Fibrinous exudate in right pleura. Greater part of upper right lobe converted into a soft lardaceous tumor	Both lungs and pleura, bronchial lymph nodes, and liver	Not given	
None	Sanguinolent fluid in left chest. Lung compressed upward and backward. Entire pleural surface infiltrated with encephaloid cancer. Left lung filled with nodules; nodules also in right lung. Cancerous infiltration of pleural lymphatics	Bronchial lymph nodes, both lungs, kidneys	No data given. Simply called encephaloid cancer	Primary seat of neoplasm probably in pleura
Occasional profuse hæmoptysis	Small primary tumor in right apex. Obliteration of subclavian vein; compression of axillary artery and brachial plexus	Subclavian lymphatic nodes, liver	No data given	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
30	GRAVES, London New Sydenham Soc., 2d Edition, Vol. 2, p. 70 Clinical Lectures on the Practice of Medicine	M	36	R	Pain in right chest, cough, dyspnœa, hoarseness. Later œdœma of face and neck; dilated veins. Dulness and tracheal respiration. Impaired mobility over all of right chest; no rales. Left chest normal. Heart sounds heard very distinctly over posterior aspect of right chest. Enlarged liver, jaundice; dysphagia, increasing dyspnœa and œdœma. Secondary tumors on lower jaw, forehead, and near lumbar spine
31	GREEN, Lancet, 1898, II, p. 1705	F	14	L	Debility, dyspnœa, signs of consolidation of left lung and effusion into pleura. Enlarged glands above right clavicle
32	GREENWOOD, British Med. Jour., 1897, II, p. 1337 A Case of Pulmonary Carcinoma	F	49	R	For several weeks cough, dyspnœa, swelling of face and neck. Hardly any air in right apex; tubular breathing left base in front. Improved for a short time, then increasing dyspnœa and cough, pain down spine. Shortly before death tubular breathing right base; œdœma both legs. Duration a little over 6 months
33	GRIFFITHS, Brit. Med. Jour., 1888, I, p. 647 Sarcoma of the Lung	M	58	L	Cough, emaciation, cyanosis, œdœma of eyelids, dyspnœa. Absolute dulness, feeble motion and respiration over left chest. Aspiration negative. Diagnosis of malignant tumor of lung made during life. Duration about one year
34	HAFNER, Med. Centralblatt, 38, 1852	M	20	R	Cachexia, tumor of right clavicle; paralysis of right arm; radial pulse smaller on right than on left side. Dyspnœa, pain, dry cough, hoarseness, dulness over upper portion of right chest; dilated veins of neck and arm
35	HANOT, Arch. gen. de Med., 1877, Vol. I, Ser. 6, p. 29 Cancer primitif du Poumon et du Mediastin chez une femme de 78 ans	F	78	L	Always well. Dry cough for long time, worse for last few months; dyspnœa, pain in right chest. Alternating diarrhœa and constipation. On admission cachexia, weakness, dulness over whole of left chest. In upper portion distant breathing sounds; increased vocal fremitus; subcrepitant rales. At base of right lung rales and some friction with slight dulness. Heart pushed to the right. Later, œdœma of feet, dysphagia, delirium. Death from exhaustion about 3 weeks after admission

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
Scant, mucoid, later bloody	Left lung normal; right lung a solid tumor with thin shell of lung tissue outside. Tumor contains some cysts	Mediastinal and mesenteric lymph nodes, lower jaw, cranial bones, and some vertebræ	No data given	As no microscopic data are given it is difficult to tell whether sarcoma or carcinoma
Not given	Entire left lung transformed into tumor, probably starting from hilus. Entire mediastinum filled with tumor; imbedded aortic arch and large vessels	Not given	No data given	
Purulent, blood-stained	Tumor size of cocoanut occupying middle and posterior mediastinum and extending along root into right lung. All other organs healthy	Not given	Not given	Probably sarcoma
Mucopurulent. No bacilli	Tumor at root of left lung extending along bronchi and larger vessels, surrounds and compresses aorta, pulmonary vessels, and œsophagus. Compression of left main bronchus	None	Not given	Possibly carcinoma
No details	Effusion in right pleura; hard lobular tumor in upper part right lung. Compression of trachea and superior cava			
No details	Left pleural cavity filled with yellow serous fluid; lungs compressed; pleura red, thickened. Posterior mediastinum filled with large, hard, white tumor containing several soft, almost fluctuating foci. Nodules as large as a pigeon's egg on trachea, directly under aorta; another mass under root of lung. Œsophagus compressed and adherent to tumor. Root of left lung surrounded by tumor; bronchus not compressed. Tumor in left lung consisting of 6 nodules extending downward and outward to	Pleura, bronchial glands. No others	Alveolar structure with polygonal cells	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
36	HARBITZ, Norsk Mag. f. Laegevidenskaben, etc., 1903, Bd. 1, p. 727	F	45	?	Sick since childhood; more or less cough. Gradual increase of cough and dyspnœa. Pain in right chest. Lymphatic glands of neck swollen. Sonorous percussion sounds over both lungs. Prolonged expiration in front and behind
37	HARRIS, Intrathoracic Growths. St. Bartholomew's Hosp. Reports, Vol. 28, 1892, p. 73	M	68	L	Pain in left chest; dry cough, increasing dyspnœa and emaciation. Bulging of left chest; absence of fremitus; displacement of heart to right. Aspiration 24 ounces. Pleura opened; foul discharge for a month. Death
38	HESCHL, Wiener Med. Wochenschr., 1877, No. 17, p. 385 Über ein Cylindrom der Lunge	M	72	R	No clinical history

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
	smaller nodules. Left lower lobe catarrhal, colloid pneumonia. Right lung soft and congested			
Often bloody	Bloody fluid in pericardial cavity with beginning mucopurulent inflammation of pericardium. In posterior mediastinum enlarged lymphatic glands, also hard, grayish, degenerating tumor. Bronchial glands and glands at root of lung enlarged. Tumor formation in bronchial mucous membrane. Lungs emphysematous but otherwise normal	Mediastinal and bronchial	Lymphosarcoma with alveoli clothed with polygonal and polymorphous epithelial cells	
No details	No autopsy			Probably carcinoma of left lung and pleura
No details	2000 c.c. clear serum in right chest. Tumor occupying almost entire right lower lobe; only small border of compressed lung tissue on upper periphery of tumor. Tumor made up of soft and very hard and cartilaginous nodules	None	Superior and anterior nodules consist of round and spindle cells with abundant hypertrophic elastic fibres. Posteriorly nodules contain several concretions and some platelets of genuine bone, masses of elastic tissue between round and spindle cells and many peculiar colloid forms of various shapes	Should be classed under sarcoma group
Mucoid	Numerous tumors on wall of left chest. Left lung entirely transformed into one large tumor in which neither vessels nor bronchi can be recognized. Left main bronchus obliterated. Pulmonary artery and vein obliterated, also left pleura. Superficial tumors communicate with internal tumors through intercostal spaces	Besides the axillary glands and superficial tumors on chest, no other metastases	No details	Probably sarcoma

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
40	HODENPYL, Proceedings N. Y. Path. Soc., 1895, p. 19 New Growths of the Lung, Mediastinal and Mesenteric Glands, Liver and Stomach	M	43	L	Fell on left shoulder; soon thereafter lancinating pain in left chest. Pleuritic effusion of bloody serum; numerous tappings. Dulness over left chest in front and behind with absolute flatness and abolished voice and breathing in lower portion. Aspiration does not afford relief. Dyspnœa and suffocation, œdœma of left arm; anasarca and ascites. Duration about 7 months
41	HOPE, J. London, 1834, p. 45 Principles and Illustrations of Morbid Anatomy	M	25	R	10 years before admission strain at cricket; ever since tenderness on right chest. On admission tumor of right chest extending from 4th to 11th rib; imperfect expansion of right chest; absolute flatness and absence of breathing sounds below 5th rib. Death 10 days after admission. External tumor noticed 18 months before admission
42	JANEWAY, Medical Record, 1883, p. 215 Primary Sarcoma of Lung	M	56	R	Progressive debility, dyspnœa, slight fever, pain in right side, dyspnœa. Flatness over half of right lung; diminished fremitus. Small quantity bloody fluid in pleura
43	JAKOBSOHN, Deutsch. Med. Zeitschr., 1897, p. 487 Sarkom der Lungen	M	46	L	Syphilis admitted. While carrying a heavy load of zinc plates on shoulder up a ladder, suddenly severe cough and dyspnœa, with much rattling and wheezing. Was carried home and since that time intense dyspnœa, impaired respiratory motion left chest; dulness over left chest and bronchial respiration. Within next week dulness becomes more intense and extensive. Some improvement after 10 mercurial inunctions; respiration more normal and patient in every way much better. Probatory puncture made and needle penetrates deeply into hard mass. (Not stated where puncture was made.) A few drops of milky, easily coagulating fluid withdrawn in syringe. This under the microscope shows numerous small round and spindle cells. Since then patient feels fairly well, but has attacks of suffocation from time to time
44	JENNINGS, Proceedings Path. Soc. of Dublin, 1867–68, p. 291	M	42	Both	Well until close of year, then intense dyspnœa, cough, slight expectoration. Pain in right chest; stridulous respiration. Dulness over right chest; absence of voice and breathing, except coarse tubular breathing in scapular

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
Bloody	Left lung almost entirely converted into a mass of new growth. Enormously enlarged mediastinal glands compressing trachea and œsophagus. Large mass above heart, encircling large vessels. Fracture of a rib with much callus	Liver, lymph nodes, and cardiac end of stomach; ulcerated nodule in stomach	Typical carcinoma in lung with well-marked alveolar structure and epithelial cells. In lymph nodes and liver alveolar structure but spindle cells	Probably carcinoma of lung
Scant, grayish	Tumor fills entire right pleural cavity except ⅓ of upper lobe. Lower lobe flattened and "inextricably confused with the tumor." Heart dislocated to left. 8th and 9th ribs destroyed by tumor, and through this space tumor emerges from chest	Upper right lobe and left lung	No details	Probably primary sarcoma of right lung
Not bloody	Neoplasm in middle and lower lobe of right lung	Tracheal, bronchial and mediastinal lymph nodes; liver	Insufficient	In extract neoplasm is called "infiltrating cancer," and description tallies with usual forms of infiltrating carcinoma. In title the tumor is called sarcoma
No details				Author diagnoses sarcoma and thinks it sarcoma of pleura
Thin and scanty. No hæmoptysis	Anterior mediastinum and anterior superior surface of lungs occupied by tumor which absorbed part of thoracic wall and formed part of tumor visible during	Mediastinal and abdominal glands; liver	No details	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
					region. Left side normal. Heart much more audible on right than on left side. Impaired mobility of right chest. Right intercostal spaces obliterated. Under right clavicle semiglobular tumor, tense and elastic. 14 days after admission enlarged gland above clavicle. Admitted August 26; died October 5
45	KEMPER, Trans. Indiana Med. Soc., 1902, 172–175 Primary Cancer of Lung	M	46	R	Chills, fever, facial paralysis. Pain in right chest. Extensive dulness from below upward on right side. Bulging of intercostal spaces; oedema of right hand; enlarged axillary glands
46	KOBYLINSKI, Diss. Greifswald, 1904 Über primäre Sarkome in der Lunge	M	75	L	No heredity. Patient was received into surgical clinic for phlegmon of penis and scrotum. There were no lung symptoms; death resulted from the surgical affection
47	KUHN, Diss. Zürich, 1904 Über maligne Lungengeschwülste	F	50	?	No heredity. Emaciation, vomiting, absence of free HCl in stomach; pain in stomach and liver; dyspnœa; enlarged liver with palpable tumor
48	LANGE, J. C. Penna. Med. Jour. Pittsburg, 1903–4, Vol. XXXIII, p. 202 Four Cases of Malignant Disease of the Lungs	M	31	R	After "cold," cough, pain in chest, loss of weight for 4 months; then œdema of right face, neck, chest, immensely distended veins. Indurated glands in neck, axilla and under pectorals. Tumor as large as orange protruded from chest, eroding 3d and 4th ribs. On physical examination many secondary nodules in both lungs

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
	life. Both pleural layers adherent to diaphragm and thorax. Substance of right lung studded with miliary granules and traversed by fibrous bands. Left lung also involved in cancer. Posterior mediastinum filled with morbid deposit and glands			
No details	Right lung solidified, some parts being "cartilaginous and greasy," others "like liver." Bronchial tubes completely occluded	Axillary glands	It is simply stated that tumor is "cancer"	
None	Tumor size of a small fist in left lower lobe adherent at its free surface to the upper lobe. On section seen to be composed of 4 smaller nodules	None	Microscopic examination seems to show fibromyoma. In epicrisis author calls the tumor "fibrosarcoma"	No secondary symptoms, no metastases; nothing speaks for malignant growth
No details	Primary nodule in lung	Pericardium, liver, both pleuræ, bronchial lymph nodes	Not given	
Mucous	None made		No details	Probably sarcoma
Profuse; creamy	Almost entire right lung converted into firm, pulpy tumor especially at root. Right main bronchus ulcerated and almost obliterated by tumor	Bronchial glands	No details	Probably primary carcinoma of right main bronchus
Profuse; not bloody	Serous effusion in left pleura. Both lungs studded with nodules size of a cherry. No tumor anywhere else	None	Encephaloid cancer	Probably sarcoma

No.	Author	Sex	Age	Lung Involved	Clinical Symptoms
51	Leibbach. Trans. Med. Soc. of N. J., 1877, p. 130 Case of Primary Encephaloid Cancer of Right Lung	M	44	R	Cough, dulness upper portion right chest in front, bronchial respiration. Pain, increasing emaciation and debility; night sweats; intermittent fever. Left lung normal. Later hard painful swelling in pectoral muscle over dull area. Duration about one year
52	Lindsey. Proceedings of Arkansas Med. Soc., 1899, p. 131 An Obscure Case of Pulmonary Cyst	M	20	L	In prison convicted of murder. Nov. 1898 oblong fluctuating tumor over 9th–11th ribs to left of spine. Flatness of left chest anteriorly and posteriorly to 3d rib; also absence of breathing. Several probatory punctures withdraw nothing but blood. No fluid in pleura. Exploratory incision made in tumor. Arterial blood flowed from incision and thoracic aneurysm was diagnosed. Patient's appetite good; no loss of flesh or strength, but rather gain. History of syphilis, and K I given. Tumor continued to grow and an enormous flow of blood followed the introduction of the smallest needle. Operative interference followed by enormous hemorrhage. Death March 1899
53	McAldowie, Lancet, 1876, II, 570 Cancer of lung in Child 5½ Months Old	M	5½ mos.	Both	No heredity. Normal at birth; other children healthy. Failed almost at once after birth. Short dry cough; emaciation; feeble breathing; few fine rales. No dyspnœa. *Percussion clear over both lungs*
54	McPhedran, Canadian Practitioner and Review, Toronto, XXV, 1900, p. 17 Carcinoma of Lung and Pleura with Occlusion	F	51	Both	No heredity. Chronic bronchitis for 16 years. About year before admission pain in right scapula, arm, and face. Incipient tuberculosis of right apex suspected. Severe nocturnal cough and sweats. Pain in right chest, weakness, hemoptysis,

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
Streaked with blood. Later purely mucoid	Almost entire right lung except small area at base and apex converted into encephaloid mass. 3d, 4th, and 5th ribs entirely destroyed	No details	No details	Nothing said about other organs
No details	Large tumor filling whole left chest and pushing diaphragm downward, heart to right and whole left lung above 3d rib. Erosion of 3 ribs where tumor had pressed out. Cystic portion of tumor had been cut off by ligatures. On section tumor showed two kinds of tissue: the outer, pinkish, glistening; inner, medullary; about ⅓ of bulk of tumor compact fibrous substance, resembling decomposing brain tissue	No details	No details	Probably sarcoma
No details	Both lungs studded with hard white nodules; hard mass at root of left lung extending through entire thickness of lung. Pulmonary tissue around nodules quite normal. Pleuræ thickened and adherent	Bronchial glands	None	
Bloody; no tubercle bacilli	Nodules in both lungs, right pleura, and diaphragm	No metastases in abdominal organs	Epithelial cells, probably from endothelium of lymph vessels; columnar cells and basement membrane, polymorphous cells	Probably primary in pleura. I. A.
No details	Both lungs studded with miliary nodules. In right lung tumor size of cherry, soft, yellowish white with hæmorrhagic centre	Liver, spleen, kidneys	No details	
No details	Cheesy masses in right lung. Miliary tubercles throughout both lungs,	Lymph nodes of left hilus	Dense, fibrous, very vascular	Author is in doubt whether it is carcinoma or sarcoma or

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
	Tuberculose et Cancer primitif du Poumon				Rales throughout both lungs. No fever
57	OSBORNE, O. T. Yale Med. Jour., Vol. IX, 1902, p. 50 A Case of Primary Carcinoma of the Lung	F	68	L	Always healthy. Recently palpitation and breathlessness. 2 months before admission some trouble with left lung had been found. On admission absolute flatness of entire chest with absence of voice and breathing and loss of fremitus except at very apex. At probatory puncture needle enters hard mass. Clinical diagnosis: tumor. Dry harassing cough, but never pain. Nodule in abdomen. Later paralysis of left recurrent. Dysphagia. Asthmatic attacks with profuse bronchial secretion from right lung. Centre of tumor begins to break down. Died about a month after first visit
58	PEACOCK, London Path. Soc., XIV, p. 40. Carcinoma of Left Lung with Secondary Deposits in Heart, Kidneys, Suprarenals, etc.	M	31	L	Cough, dulness over all of left chest. Almost entire absence of breathing sounds; feeble vocal vibration. Heart displaced to right. Swelling of lower costal cartilages; enlargement submaxillary glands. Death from exhaustion. No bronzing, but dingy complexion. Duration about 8 months
59	PEACOCK, Trans. London Path. Soc., IX, 1859	M	58	Both	Disease commenced with hæmoptysis. Later larger and smaller masses were ejected with cough. Dulness, bronchial respiration; deficient breathing; crepitation over varying areas in both lungs. Later increasing dyspnœa. Diarrhœa. Pain in chest, especially left side. General anasarca with normal urine; later anasarca disappeared except in face. Duration about 4 months
60	PEPPER, Trans. College of Physicians, Penna., 1850–53	F	27	R	Pain, swelling of right arm, chest, and mamma. Feeble pulse. Flatness over entire right chest; bronchial breathing; no rales. Right chest distended; dyspnœa, slight dysphagia. No cough
61	PÉRIER ET NEUVILLE, Jour. des Connaissances Med. prat. T. I. 1833–34, p. 104 Dégénérescence squirrheuse de la totalité du Poumon droit, Phthysie consécutive,	M	24	R	Grandfather died of cancer. Dry cough for several years. When lifting a heavy weight felt sharp pain in right side. Some weeks later tumor in right side, where pain had been. On examination dry cough, tumor size of filbert adhering to 6th rib. Dulness over right chest. No fever. 8 months

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
	spleen, and liver. Left upper lobe transformed into dense grayish tumor containing small cavities		stroma enclosing alveoli filled with partially necrotic epithelial cells	a combination of both
Occasionally bloody, no tubercle bacilli. Numerous flat epithelial cells thought to be alveolar cells	Whole of left lung shrunken into cancerous mass with greatest consolidation at root. Base of heart attached to tumor, also chest walls; broken down in centre. Right lung healthy	Both kidneys and skin	No microscopic examination made	
Bloody, large masses of pus	Tumor infiltration of almost all of left lung; bronchiectatic cavities	Various lymph nodes, heart, peri- and endocardium. Complete tumor degeneration of both suprarenals	No details	Probably sarcoma
Bloody and purulent. masses ejected	Tumor masses in both lungs with numerous cavities containing pus and necrotic material	None in other organs	Both tumors and the coughed-up material consist of spindle and round cells	Probably sarcoma
None	Tumor masses throughout right lung. In mediastinum a large tumor surrounding aorta and compressing lower cava, pulmonary artery, trachea, and œsophagus	Bronchial and mesenteric lymph nodes, head of pancreas, and *ovaries*	Not stated	Some doubt whether primary in lung
No details	Tumor occupied whole of right chest and part of left, adherent to pericardium, left costal cartilages, sternum, right ribs, and vertebral column; around 6th to 8th ribs it penetrates to subcutis, forming there a	Probably in abdomen. Statements not very clear	Not given	

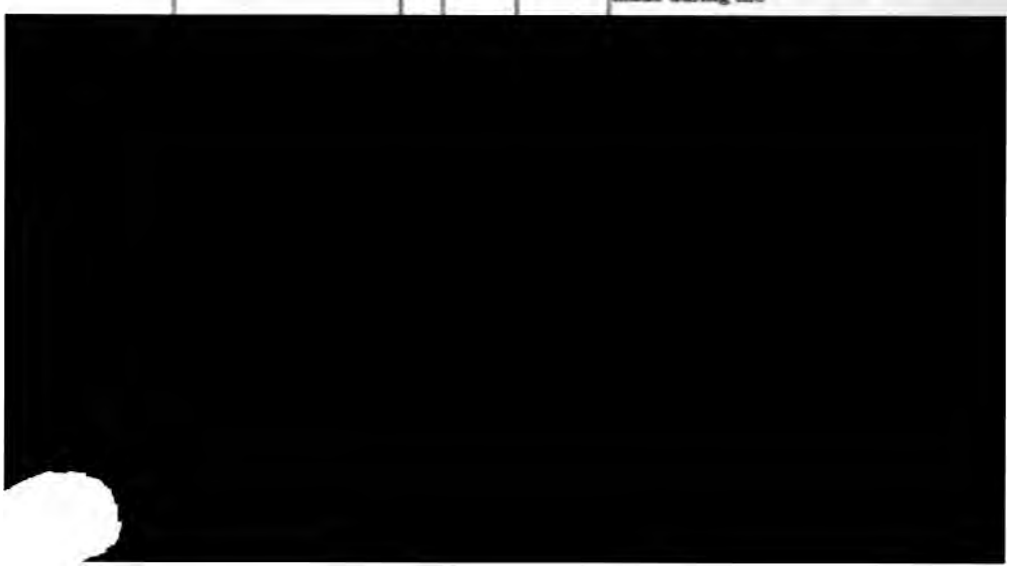
NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
	Mort après dix-neuf mois de Maladie; Nécropsie				later diagnosis of empyema was made, but no trace of liquid was found on operation. After 19 months of sickness: extreme emaciation, chest more distended on right than on left, hard nodulated tumor under right breast. Dulness over right chest with absence of respiration. Tumor in abdomen attributed to liver. Œdema of lower limbs; intense dyspnœa
62	POWELL, Middlesex Hospital Reports, 1892. London, 1894, p. 87 Malignant Disease Invading Right Lung. Gastric Ulcer	M	58	R	Sick for about a year with gastric symptoms. Cough for about 3 years; lately worse. In bed for 19 weeks before admission with dyspnœa and wasting. On admission œdœma of right arm, dilated veins of right chest. Impaired respiratory motion. Dulness and flatness over most of right chest. Feeble or bronchial breathing. Heart beyond nipple line. No change in physical symptoms until death. Duration probably several years
63	POWELL, London Med. Gaz., 1850, XI, pp. 1029, 31	F	74	R	Severe pain in right chest. Right lung completely dull; feeble breathing sounds. Slight cough
64	PREVOST, Compt. rend. Soc. de Biol., 1875–76, II, 175–180	M	44	R	Cachexia. Indefinite dyspeptic symptoms. Frequent tappings for hæmorrhagic pleural effusion. Dyspnœa
65	PRUDHOMME, Union Med. du Nord-Est, Reims, 1903, p. 213 Cancer lobaire primitif du Poumon Gauche	M	62	L	No heredity. For 5 months rapid decline of strength. Slight attacks of cough. Flatness on left anterior chest from top to below left mammilla; behind about 2 fingers below spine of scapula. Over all this area absence of voice and breathing. No rales. Dyspnœa on slight exertion; some

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
	large, white, nodulated lardaceous mass. Tumor had 3 cavities containing serum and pus. At upper and posterior part of tumor a thin layer of lung tissue; remainder all scirrhous. Upper lobe right lung compressed by tumor. Heart displaced to left. Albuminous mass in abdomen			
No details	It is simply stated malignant growth invading right lung; old gastric ulcer. No other details given	No details	No details	
Scant, hæmoptysis	Slight effusion in pleura. Right lung almost completely transformed into solid cartilaginous tumor	No details	None made	
Yellow, albuminous	Tumor with cavity at base of right lung	Right lung and pleura	No details	
Scant, showed nothing characteristic	Entire upper left lobe invaded by cancerous mass broken down and forming cavities containing creamy matter	Cancerous nodules in mediastinum extending to pericardium compressing aorta and pulmonary artery. No other metastases	No details	
Scant, mucoid. Hæmoptysis	Large tumor between apex of left lung and arch of aorta. Compression of œsophagus and left bronchus. Mass between trachea and œsophagus pressing on recurrent laryngeal. Left lower lobe infiltrated with soft tumor	Bronchial and mediastinal lymph nodes	No details	Possibly sarcoma
Mucopurulent, oc-	Simply stated that "tumor was found to be a lym-	No details	No details	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
	1889, Vol. XXXI, p. 454 A Case of Tumor of the Lung				hoarseness. Dulness over upper portion right lung; increased vocal fremitus; prolonged expiration; all kinds of rales. No fever. Enlarged and tortuous veins of abdomen and chest. Apex beat dislocated to left. Heart sounds heard distinctly over dull area. Rapid increase of dulness and some bulging of right chest wall. Œdœma of hands; slight exophthalmus of right eye. Duration about 4 months
68	ROE, Lancet, 1866, II, 723	F	23	L	Cough, dyspnœa, pain in chest. Flatness and harsh respiration. Right lung normal. Symptoms of pericarditis and pneumonia, then smallpox and death
69	ROTTMANN, Diss. Würzburg, 1898 Über primäres Lungencarcinom	M	47	R	*Syphilis.* Complained of lungs for 2 years. Emaciation and debility. *Spontaneous fracture of right thigh.* Flatness at right base posteriorly, slight bulging of chest, diminished voice and breathing. Cough
70	RUSSELL, London Med. Times and Gaz., 1864, II, p. 278	F	38	L	Extreme dyspnœa. Flatness over left chest. Respiratory immobility; intercostal spaces retracted. Exploratory puncture, some blood. Lower lobe cleared up before death
71	RUSSELL, Lancet, 1869, I, 814	F	30	L	Distress after eating, frequent vomiting, cough, dyspnœa, palpitation. Pain in left shoulder, chest, and arm. Impaired respiratory motion. Dulness at apex with absent breathing and voice. Effusion in left chest
72	SEE GERMAIN, Revue Med., 1881, XXXI, 121–127 L'Union Med. Diagnostic de Cancer pulmonaire	M	46	L	Pain, dyspnœa. Flatness and absence of voice and breathing over left chest. Small hard lymph nodes above clavicle
73	SILVA, Gaz. degli Ospidali e delle cliniche Milano, XXII, 1902, Serie II, p. 1236 Sarcoma primario del Polmone	M	52	L	No heredity. 7 years ago acute pulmonary disease with cough. For one month dry cough, and severe pain radiating to both lower limbs and left shoulder; also behind sternum. No fever. Obstinate constipation; anorexia. Impaired expansion of left chest; loss of voice and breathing. Complete flatness. Emphysema of right lung. Two punctures withdraw small amount of bloody serum, but needle enters into hard tumor mass. Slight fever and much intestinal disturbance. Death after 3 months in hospital

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
casionally tinged with blood	phadenoma probably originating in mediastinum, some portions of it having caseated and broken down"			
One hæmoptysis	At base of left lung hard cartilaginous tumor, compressing bronchus and œsophagus and extending to left auricle. Bronchiectatic cavities throughout left lung	Right lung	No details	Possibly sarcoma
Abundant	Large tumor in right lower lobe, partially necrotic and purulent. Lower and middle lobes diffusely infiltrated. Left lung normal	Bronchial lymph nodes and right femur. No others	Partly carcinoma, partly sarcoma	
No details	Hilus of left lung surrounded by tumor enveloping bronchus and large vessels. Infiltration of upper lobe	Left bronchial lymph nodes only	No details	
Bloody	Cancerous nodules around root involving posterior upper left lobe, extending into left auricle. Tumor proliferates along bronchial tract. Left bronchus and pulmonary veins compressed	Bronchial lymph nodes	No details	
Pus and blood	No autopsy	Axillary and supraclavicular lymph nodes	No details	There was no autopsy, but the physical signs and sputum as well as absence of fever and rapid aggravation, all point to tumor of lung
No details	Left lung shrunken and adherent, containing tumor size of melon, hard and fibrous and adherent to pericardium. Pulmonary artery compressed. In interior of tumor numerous bronchiectatic cavities filled with purulent secretion. Lung tissue surrounding tumor atelectatic and œdœmatous	Liver, suprarenals, ribs, vertebræ	No details	Probably carcinoma

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
74	Sims, Medico-Chirurg. Trans., Vol. XVIII, London, 1833, p. 281 On Malignant Tumors connected with the Heart and Lungs	M	43	R	For about a year before admission various hemoptyses, sometimes profuse; dyspnœa and severe oppression. Later harassing cough. Dullness on right chest anteriorly; absent breathing. Dilated jugular veins; swelling of head and neck. Diagnosis made during life
75	Loc. cit.	M	64	L	Hemiplegia for about 12 months. Cough and other pulmonary symptoms for several years. Brain symptoms predominated and no attention was paid to lungs
76	Sparks, Lancet, 1871, II, 13 Primary Cancer of the Lungs	F	22	L	Diagnosis of pleuro-pneumonia. No other clinical data
77	Stirell, Lancet, 1894, I, p. 388 A Case of Tumor of the Lung	M	49	L	No previous illness. No symptoms pointing to lungs. Routine examination showed dulness over whole left chest with loss of fremitus and absence of breathing over lower part chest. Slight cough. Later high fever and pericardial friction. Clinical diagnosis: fibroid phthisis
78	Stokes, New Syd. Soc. Ed., 1882, p. 386 Diseases of the Chest	M	36	R	Some pains in right side; cough, hoarseness, dyspnœa; œdœma of face and neck. Dulness over entire right chest; gradually loss of voice and breathing sounds. Heart sounds heard all over right chest. Later enlarged liver and jaundice. Tumors appear on forehead, lower jaw, and lumbar spine. Diagnosis of tumor made during life



SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
Mucoid, hæmoptysis	Solid tumor probably starting from hilus of right lung, involving greater part of right chest and compressing large vessels, trachea, and right main bronchus. Bronchiectatic cavities in tumor. Upper cava involved	Bronchial lymph nodes and heart	No details	Possibly carcinoma of bronchial origin
No details	Upper lobe of left lung contains tumor size of a small orange of medullary character. Traces of chronic pneumonia and solid gray hepatization, also a few patches resembling gangrene	None mentioned	No details	
No details	Large nodulated "encephaloid" tumor in lower left lobe infiltrating diaphragm and pleura. Heart displaced to right	Right lung, both pleuræ	No details	
Scant, slightly bloody early in disease	Effusion in left chest. Left lung compressed; upper lobe infiltrated with soft, white new growth. Bronchus of lower lobe almost entirely obstructed by tumor. Suppurative pneumonia lower left lobe	No details	Insufficient; tumor is called lympho-sarcoma	Possibly carcinoma
Scant, occasionally bloody	Very large tumor in place of right lung of which a compressed portion is found over posterior surface of tumor. Tumor contains cysts and envelops trachea, large vessels, and pericardium. Right main bronchus compressed and obstructed	Mesenteric and retroperitoneal glands compressing common bile duct	No details	Probably sarcoma
Bloody	Large tumor from root to apex in left lung; gangrenous cavity in lower lobe	No details	No details	Possibly bronchial carcinoma
Copious, frequently bloody	Entire lung converted into tumor containing bronchiectatic cavities	No details	No details	Probably bronchial carcinoma

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
81	Loc. cit.	M	44	R	Cough, dyspnœa, pain. Increasing dulness over right lung. Dilatation of veins. Feeble respiration. Increasing volume of chest. Œdœma of face and chest. A month later some improvement; retraction of right chest. Clinical diagnosis: empyema and malignant tumor
82	Stone, Clinical Cases Med. & Surg., New York, 1878, p. 55 Tumors in the Lungs, etc.	M	4	Both	Always thin and feeble. Some weeks before death difficult breathing, which became "asthmatic." Extreme dyspnœa. Right lung solid on percussion; bronchial respiration. Flatness over left lung; mostly bronchial respiration; some cough. Clinical diagnosis: thymus asthma or pneumonia, but as there was no fever the latter was doubted
83	Strehlin, Diss. München, 1904 Primäres Endotheliom eines Hauptbronchus und der Lunge	M	70	R	Practically moribund on admission. Intense dyspnœa, cough. Suffering more or less for a long time, but more in the last 2 months. Owing to patient's condition examination was very imperfect. Emphysema of both lungs; loud tracheal rattle, diffuse rales over both lungs. Clinical diagnosis: myodegeneration of heart, bronchitis, arteriosclerosis, emphysema
84	Suzanne, Journ. de Méd. de Bordeaux, 1883–4, XIII, p. 573	M	35	R	Cachexia, palpitation. Œdœma of right face, arm, and trunk. Dilated veins. Tumor in left axilla and over clavicle. Right chest flatness; cavernous breathing; imperfect respiratory motion
85	Tinniswood, London & Edinburgh Monthly Journal of Med. Science, 1844, p. 550 Lardaceous Schirrhoma of the Lung Involving the First Rib, Clavicle, etc.	M	41	R	For over a year cough, dyspnœa, and occasional hæmoptysis. Large hard tumor arising from 1st right rib and clavicle. Emaciation. Dulness over right chest; diminished voice and breathing. Dilatation of veins of neck and chest. Œdœma of right arm with pain and numbness. Fracture of clavicle. Duration of disease about a year and a half
86	Trotter, British Med. Jour., 1871, II, p. 583	M	30	R	Dulness below right clavicle with fine rales. Later signs of cavity. Still later abdominal pain, fullness and tympanites

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
Bloody and "black currant jelly"	Pus in right pleura; right lung converted into large tumor; bronchiectases	No details	No details	
No details	Thymus normal. Tumors in both lungs which compress lung tissue; most of the tumor subpleural, although some imbedded in lung. Tumor resembles Malaga grapes in shape and size; white, not fatty	No details	No details	Autopsy incomplete, but nevertheless likely that tumor is primary in lungs. Probably sarcoma
Bloody	Large quantity of turbid serum in left pleura; right pleura obliterated. Primary endothelioma of right bronchus with extension into lung. Purulent bronchitis. Bronchiectatic dilatation. Purulent degeneration of peribronchial lymph nodes Pericœsophageal abscess. Upper and middle right lobes matted together. Bronchiectatic cavity, size of hen's egg with numerous small gray nodules in its wall, communicates with dilated bronchus. Bronchi filled and obstructed by tumor masses	Both kidneys	Fine fibrous stroma containing numerous branching and communicating alveoli filled with small, closely packed cells like endothelial cells; here and there concentric layers of cells. Much necrosis	May be classed as carcinoma or endothelioma. The branching and communicating alveoli, probably lymphatics, point to endothelioma
Some hæmoptysis	Fluid in left chest. Heart displaced to left. Large vessels compressed. Tumor in upper cava. Greater part of lung converted into tumor connected with tumor in mediastinum	Liver, mesenteric glands	No details	
Mucous, often tinged with blood	Right upper lobe completely transformed into tumor which extends into middle lobe. Tumor came up from lung into superior thoracic opening and involved clavicle and ribs. Autopsy not complete	No details	No details	Probably primary sarcoma of right upper lobe
Hæmoptysis	Right upper lobe almost entirely destroyed by soft tumor, degenerated and forming a cavity	Right lung, left lung, kidneys, right 5th rib, 4th left rib	No details	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
87	VON PFLUG, H., Diss. München, 1904 Über primäre Lungengeschwülste	M	70	L	For several years cough; later pain in left chest, increasing cough and some fever. Dulness over whole of left chest; at base posteriorly flatness. Over dull area loud bronchial respiration, fine mucous rales. Probatory puncture: negative. Tumor suspected. Slight dysphagia. Sudden death through profuse hæmoptysis
88	VAN GIESON, Medical Record, 1879, XVI, p. 495 Cancer of Lung	M	30	L	No heredity. Severe pain in left chest; dry cough. Left arm œdœmatous. Cyanosis; dulness below left clavicle. Left chest 1½ inches larger in circumference. Absence of respiratory sounds over all of left chest. Exploratory puncture negative. Exophthalmus left eye; pupils dilated. Severe dyspnœa
89	WACHSMANN & POLLAK, New York Med. Record, Nov., 1904 Three Cases of Primary Malignant Tumor of the Lung	F	60	L	Commenced with pain in left shoulder and cough; hoarseness. Flatness over left upper lobe and at base; diminished breathing sounds. Bulging of left thorax. Clubbed fingers. Periosteal tumor over left temporal bone
90	LOC. CIT.	F	38	L	Cough, pain in left chest, impaired respiratory motion and flatness from 1st rib to base. No respiratory sounds in left axillary line or in back. Paralysis of left vocal cord
91	WACQUEZ, Journ. des Sciences Med. de Lille, XIIe Année (Tome I, 1889) p. 393 Cancer primitif du Poumon	M	46	L	No heredity; no previous illness. Sudden expectoration of clotted blood without apparent cause. Recurrence shortly with considerable hæmoptysis. Some sweating and fever. Later severe pain along spinal column and at base of thorax; excessively sensitive to touch. Cough very painful. Increasing dyspnœa. On examination right lung normal. Left lung: dulness anteriorly with absence of breathing and diminished voice. Puncture: bloody effusion containing many epithelial cells with granular fatty degeneration. No relief after puncture. Death after about 6 days in hospital. Duration from first hæmorrhage about 7 months

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
At first scant, later more abundant. Shortly before death, no sputum. Occasionally slight mixture of blood. No tubercle bacilli, no tumor cells	In place of lymph nodes at bifurcation, a large encapsulated tumor, perforating into œsophagus and extending into left main bronchus and causing extensive ulceration. Erosion of large branch of left pulmonary artery. Chronic inflammation of left lung; numerous bronchiectases	Bronchial lymph nodes	Fibrous stroma containing numerous communicating cavities lined or completely filled with flat endothelial-like cells tending to necrosis and often arranged in successive layers	Author himself considers it not absolutely certain whether cells should be classed as epithelial or endothelial or the tumor as endothelioma or carcinoma
None	Bloody serum in left pleura. Hard white neoplasm involves nearly whole of left lung which is adherent to chest wall and pericardium. Tumor in apex of right lung	Pericardium, right lung, liver, sternoclavicular articulation	No details	Possibly sarcoma
No blood, no tubercle bacilli. Cells which resemble cancer cells	Incomplete details	Heart, liver, ribs, kidneys, clavicles, skull, suprarenals, mesenteric, retroperitoneal, and regionary lymph nodes	No details	Probably carcinoma
Profuse, greenish, occasionally bloody	Entire left lung taken up by soft white neoplasm; compression of œsophagus and trachea; hæmorrhagic effusion in pericardium. Broncho-pneumonia right upper lobe	Lymph nodes, liver, pericardium, pleura	No details	Probably epithelioma
Bloody, frequently currant jelly	Bloody effusion left pleura. Upper left lobe solid grayish mass of encephaloid tumor; softening in central portion. Bronchi permeable to centre of neoplasm where they become replaced with neoplasm	Right lung and left suprarenal	No details	Probably carcinoma

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
92	WALDENSTROM, J. A. Deutsche Klinik, 1874 No. 22, p. 169 Cancer Pulmonum	F	31	Not stated	Anæmia, dyspnœa; dulness and harsh respiration over left base; sibilant rales. No other signs on lungs or other organs. Clinical explanation of the dyspnœa: emphysema, although no signs of this. Rapid increase of dyspnœa; general bronchitis with abundant secretion. Broncho-pneumonia; death
93	WATERS, British Med. Jour., 1886, I, 335	M	44	R	Dyspnœa; dulness over whole right chest; impaired respiratory motion, faint breathing and fremitus. 22 ounces dark fluid removed by aspiration; *physical signs remain unchanged*
94	WEICHSELBAUM, Virchows Archiv., LXXXV, 1881, p. 559 Papillãres Adeno-sarkom der Lunge	F	67	R	Clinical diagnosis: bronchiectasis and effusion into right pleura
95	WHITE, Dublin Quarterly Journ. of Medical Science, 1865, XXXIX, 219–222	F	56	R	Pain; slight dulness below left clavicle; in some parts right lung total absence of breathing; dulness over entire lower posterior portion right lung. Dysphagia, hectic fever. Effusion in right chest
96	WILLIAMS, Lancet, 1878, II, 732 Cancer of Lung and Pleuro-pneumonia	M	40	L	Pain in left chest, increasing dyspnœa and emaciation; cough. Dulness at base of left lung. Diminished respiration, but increased vocal fremitus; subsequently complete absence of breathing sounds. Dysphagia. Liver enlarged
97	WILSON, Edin. Med. Jour., 1857	F	Not stated	L	Symptoms of pleurisy. Dyspnœa, cachexia. Duration 6 months
98	WOODMAN, BATHURST, Med. Times & Gaz., London, 1876, I, p. 411 Case of Encephaloid Cancer of Bronchial Glands and Left Lung	F	45	L	For 10 months bronchitis and loss of weight. On admission pain in left side and left arm. Dulness over left chest, bronchial breathing, absence of fremitus. Two months later a hard nodule appeared under upper border of left trapezius. Two months later enlargement of left axillary glands on mass on left side of neck

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
No details	Simply said to be primary cancer of the lung	No details	No details	
Scant, rust colored	Malignant disease of right pleura involving right lung along septa	Pericardium, diaphragm, large and small omentum	No details	Doubtful whether primary in lung
No details	Small spherical tumor near hilus of right lower lobe	No details	Multitude of villi, the bodies of which are made up of round and spindle-shaped cells covered with cylindrical epithelium. Glandular structures lined with cylindrical, sometimes with ciliated epithelium also found	Author calls the tumor a papillary adeno-sarcoma
Bloody, expectoration of "fleshy-looking masses"	At root of right lung a large tumor extending into lower lobe; posterior mediastinum filled; large encephaloid mass projecting into pericardium. Œsophagus compressed	No details	No details	
Rusty	Large nodular tumor at root of left lung, penetrating and nearly obliterating left bronchus and invading lower portion of lung	None	No details	
Hæmoptysis	Fluid in left pleura. Several nodules in upper part left lung, especially along bronchi	No details	No details	
Elastic fibres and pus cells. No tumor elements	Tumor involving upper ⅓ of left lung and connecting with mass in neck. Infiltration extended to mucous membrane of left main bronchus almost completely obstructing it. Bronchiectatic cavities base of left lung	Right lung, heart, liver	No details	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
99	YEO, J. BURNEY, British Med. Jour., March 13, 1874, p. 342 A Case of Mediastinal Cancerous Tumor Leading to Occlusion of the Right Bronchus, etc.	M	53	R	Cancer and tuberculosis in family history. Had lues 20 years ago. Six months previous to admission bronchitis, chills, pain in right side. Pleuritic exudate which was entirely absorbed within a few weeks. On admission cachexia, heart pushed to right. Dulness all over right chest and feeble breathing

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
No details	Tumor size of an orange in anterior and posterior mediastinum, hard, whitish, extending into right bronchus almost entirely occluding it	Nodules in right upper lobe	Medullary cancer with much connective tissue and characteristic cells with large nuclei	Probably primary in right bronchus, and the tumor in anterior and posterior mediastinum a secondary inflammation of the lymph nodes. I. A.

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
1	BORRIS, Arbeiten aus dem Path. Anat. Institut zu Tübingen (Baumgarten) .. Vol. VI, Ht. 2, p. 539 Über primäres Chorionepitheliom der Lunge	F	28	R	Married at 22; 4 children. Last childbirth 14 months before admission to the hospital. A few weeks before admission cough, expectoration, night sweats, pain in right chest. On admission dulness at apex of right lung; flatness over remainder of lung, bronchial breathing, numerous friction rales. Left lung normal. Later signs of effusion in right pleura. Tappings withdraw clear yellow serum. Later several abundant hæmoptyses. Death 2½ months after admission
2	BRIESE, Beiträge zur wissenschaft. Med. Festschr. etc. Braunschweig, 1897, p. 191 Ein Fall von metastasirenden Lungenendotheliom	M	40	L	No heredity. Pleurisy on right side 18 years ago. Since then cough, expectoration occasionally very abundant; once hæmoptysis. For 2 years, after attack of influenza, more cough, pain in chest, progressive loss of weight. Later severe intercostal neuralgia on right side. Dulness and diminished respiration, loss of fremitus over all of left upper lobe. A few weeks before death nodules from the size of a hazel nut to that of a hen's egg in skin of abdomen and leg, which when incised show a viscid fluid. Death in extreme marasmus
3	BRUNET, Bull. Soc. d'anat. et de Physiol. de Bordeaux, Vol. XII, 1891, p. 115 Cancer du Poumon	M	20	R	Four years before admission amputation of right leg at thigh for tumor. One month before admission violent chills, harassing dry cough, intense dyspnœa. Right chest bulging. Flatness from angle of scapula to base; in front from infraclavicular fossa to base. Intercostal muscles do not contract. Respiration feeble, distant. Marked ægophony. Nothing on left chest. Puncture, 600 c.c. bloody serum; flatness not diminished. Gradually all symptoms increase; œdœma. Several punctures made and after the last decided improvement, dyspnœa better, cough not so harassing; respiration on right chest almost normal; some pleuritic friction. After a few days return of all symptoms; intense dyspnœa, sibilant rales, failing appetite and fever. Severe pain in back of chest. Repeated punctures, always bloody serum. Death about 2 months after admission
4	CHARTERIS, M. Lancet, 1874, I, p. 126 On Intrathoracic Cancer	M	29	R	Pleurisy 5 years previously. 11 weeks before admission caught cold, followed by anorexia, cough, night sweats; hæmoptysis 3 days before admission, when became hoarse and tumor appeared on right side of neck. On admission dyspnœa, pain in epigastrium, and vomiting. Dulness over lower half of right chest in front and

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
Greenish, mucoid, no tubercle bacilli. Hæmoptysis	Bloody, turbid fluid in left pleura. Nearly whole of right lung occupied by large tumor besides a number of smaller nodules. The large tumor contains hæmorrhagic and necrotic areas. Tumor penetrates into upper cava and extends upward into vein	Both lungs. None in lymph nodes. Hæmorrhagic focus in right broad ligament	Typical chorion epithelioma	Clinical diagnosis was uncertain though inclined to tuberculosis. At the autopsy no definite diagnosis could be made. Microscope alone gave the proper diagnosis
Tenacious, contains elastic fibres. No tubercle bacilli. Hæmoptysis	Cavity size of fist in lower part of left upper lobe, filled with cheesy masses and having hard, irregularly protruding walls	Skin, liver, kidneys, left psoas, lumbar, and 11th and 12th thoracic vertebræ	Endothelioma. Mucoid degeneration of cells. Metastases are all cystic and contain viscid, tenacious, clear mucus	Author gives many reasons in detail why he has classed this tumor as epithelioma and not carcinoma
Abundant, *green*	Whole of right lung transformed into an encephaloid irregular mass without any trace of lung tissue, adherent in its entire extent to chest wall. Left lung normal	Large secondary tumor in liver	Not given	Probably sarcoma. Remarkable for length of time, 4 years between primary and secondary growth, and for its recurrence as a massive tumor involving whole of right lung
Scant, rusty, later purulent, abundant, often bloody	Large cancer at tracheal bifurcation extending into right lung, adherent to posterior wall of pericardium and extending through into both auricles. Right vagus imbedded in tumor	No details	Not given	Course of disease remarkably rapid

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
					behind. Some dulness on left side anteriorly. On right side anteriorly below: diminished expiration, distant bronchial breathing. Increasing dyspnœa and aphonia; swelling over right vocal cord. Death on 23d day after admission
5	COUVELAIRE, Annales de gynéc. et d'obst., LX, 1903 Dégénérescence Kystique congénitale du Poumon, etc.	M	6 days	R	Parents normal health; good family history, uneventful normal pregnancy, normal birth. After birth, child cried, breathed, and behaved like normal child. On 5th day respiration became short and rapid; cyanosis set in; child refused breast and 6 days after birth died. No precise diagnosis was possible

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
None	Middle lobe of right lung connected with an enormous cystic mass causing compression and atelectasis of upper and lower right lobes. Hypertrophy of right ventricle of heart. Cysts irregular in dimension	No details	Cyst-adenomatous structure. Cuboid and cylindrical epithelium with basement membrane with irregular nuclei near base. Where normal lobules of pulmonary tissue exist they are completely atelectatic. The bronchial ramifications are represented by irregular canals of varying calibre and extremely simple structure out of which develop the adenomatous tubules. The only suggestion of intralobular bronchial differentiation are patches of cartilage imbedded in connective tissue in the vicinity of the pulmonary vessels	
Abundant, mucopurulent	Retroperitoneal tumor size of child's head from lumbar lymph nodes. Nutmeg liver, numerous nodules, larger and smaller; nodules of spleen; 2 nodules replace left testicle. Both lungs completely filled with nodules. Diaphragm per-	Mentioned under autopsy	No details	Author goes into details as to how all the symptoms pointing to tumor of the lung were wanting — the slight cough, no characteristic sputum, no dyspnœa, no pain, no dilatation of

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
					diagnosis: tuberculosis. Enormous liver also taken as phthisical symptom. No fever. Emaciation continues notwithstanding improved appetite. Miliary tuberculosis is thought of, but lack of fever speaks against it. Two days before death tumor as large as a fist and painless, is recognized in left flank. Death one month after admission
7	DIONISI, Arch. di biol., Firenze LVII, 1903, p. 716 Sulle degenerazione policistica dei polmoni	M	19	Both	For some time cough, dyspnœa, slight cyanosis, occasional night sweats. End of December, 1902, fever, dyspnœa, pain about right breast. Dulness below right spine of scapula; harsh breathing and crepitant rales. Temperature up to 39.1. This state continued until January 5 with rapid decrease of temperature and signs of heart failure. Death
8	EHLICH, Primäres Carcinom an der Bifurcation der Trachea Monatschr. f. Ohrenhlk., 1896, No. 3, p. 121 (Klinik v. Schrötter)	M	65	?	No heredity; no serious illness. For 2 years cough and hoarseness at times. General health good. Later slight dyspnœa on exertion, dysphagia, dulness at right apex. *Laryngoscope shows tumor obstructing both right and left bronchus.* Intense dyspnœa; pneumonia of left lower lobe. Attempt at suicide by stabbing in chest; death
9	KRAUS, JOSEPH, Diss. Bonn, 1893 Ein Fall von ausgedehntem links-seitigen Pleuratumor	M	39	L	No heredity. Three years previous to admission, left pleurisy; well after 2 months. Since then occasional pain in left chest, though working. For some months constant pain in left lower chest, cough, increasing dyspnœa, trigeminal neuralgia. Dulness left upper lobe; absence of fremitus and breathing. Some areas of bronchial breathing posteriorly. Heart displaced towards right; loud systolic murmur at base. No pulsation in jugular notch. Left jugular more full than right. Probatory puncture yields only a few drops of bloody serum. Increasing pain in left axilla. Œdœma of upper left arm. Paralysis of left vocal cord. Percussion of chest becomes very painful. Right pupil larger than left. Clinical diagnosis:

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
	forated both sides by tumor. From history taken only after death of the patient it appears that primary tumor of the testicle was operated some years previous			veins, no bloody effusion in pleura, no lymph nodes
Rusty	Fibrinous pleurisy on right side; acute bronchitis. Left pleura thickened. On section of right lung a system of numerous cavities of varying size and alveolar aspect decreasing in size and number from above downward. In lower lobe very firm alveolar appearance, resembling thyroid gland. In apex of left lung similar system of cavities. Genuine lung tissue was firm with increased consistency like brown induration	No details	Areas of emphysematous lung tissue; also areas where the lung tissue is replaced by tubular structure, the tubules lined with epithelium mostly in single layers and cylindrical; other tubules suggest acinous structure; others filled with exudate and leucocytes	According to the author this is not a true neoplasm, but a congenital cystic process depending upon the arrest or disturbance of the process of development
Mucoid, at times bloody. No tubercle bacilli, no tumor elements	Scirrhus at trachea at bifurcation extending directly into both bronchi. Cancerous infiltration of œsophagus	None. Not even in adjoining lymph nodes	Not given	
Mucoid, more or less abundant, never bloody	Bulging of left chest: stomach enormously distended, reaching almost to symphysis. Heart beyond right mammillary line. Clear serum in pericardium. Grayish red tumor masses fill whole of left pleural cavity. Right lung displaced downward. Tumor masses between spine and pericardium. The tumor fluctuates at apex; lower portion grayish atheromatous masses with numerous hairs, cartilage, and bone. (Dermoid cyst of mediastinum)	Right pleura	Grayish red tumor is spindle cell sarcoma	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
					tumor in chest probably not carcinoma on account of scanty and not bloody sputum. Bulging of left chest; left jugular vein becomes hard. Œdœma of left leg. Increasing dyspnœa. Much albumin in urine. Admitted Aug. 23, 1892; died November 11
10	KLEMM, Diss. München, 1905 Über ein primäres Endotheliom der Lunge	M	30	Both	Extreme dyspnœa. No lesions could be detected in lungs or heart to explain dyspnœa. Repeated examinations with bronchoscope negative. Patient died of suffocation on day of admission to hospital
11	LABBÉ, Gaz. des Mal. infantile etc., et d'obstet. Paris, 1909. No. 15, p. 113 Kyste hydatique pulmonaire chez une fillette de 8 ans. Vomique, Guerison	F	8	L	Cough and bronchitis for a long time. First seen February, 1907. Since August, 1906, intermittent cough with febrile attacks and sweating. *Some scant hæmoptyses.* Diffuse bronchitis and gastro-intestinal symptoms. Diagnosis of intestinal grippe is made. Beginning of May, breath becomes fœtid. X-ray shows shadow of upper $\frac{3}{4}$ of left lung with sharp border. Dulness below clavicle; bronchial respiration; mucous rales; absence of fremitus. Pleuro-pneumonia is diagnosed and puncture is made posteriorly (!), but only a few drops of clear serum withdrawn. 32 hours thereafter violent pain in left chest; no fever. Suddenly vomited large quantities of pus, white, thick, and fœtid, containing particles that look like membrane. Some purulent and bloody mucus is expectorated. After this gradual diminution of all symptoms. Physical signs in left chest gradually disappear and improvement is followed step by step by radiograph. September, 1907, the healing is complete except some signs of cavity below left clavicle
12	LASÈQUE, Arch. Gen. de Med., 1874, Vol. I, p. 486 Pleurésie droite développée sous l'influence d'un Lymphosarcome en voie de généralisation	M	49	Both	Six weeks before admission pain in right chest with slight chill, fever and dyspnœa gradually increasing. Dulness from angle of scapula downward. Bronchial breathing above, diminished breathing over middle $\frac{1}{3}$ and absence of breathing at base. Dulness from mammilla downward anteriorly, also with absence of breathing. Liver enlarged. Later renewed chill and next day exudate filled entire right chest. Profuse sweats, anorexia,

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
No details	Sanguinolent serum in both pleuræ. Almost entire left lobe consists of very firm and dense tissue containing no air except a thin peripheral layer. Fibrous proliferation along bronchi. Everywhere conglomerations of miliary nodules. Lower lobe of right lung in same condition as left. Upper lobe numerous, often confluent miliary nodules	Bronchial, tracheal, and mediastinal lymph nodes	Firm, fibrous tissue mostly in a state of hyaline degeneration. Nodules consist of very small fusiform cells surrounded by giant cells. No tubercle bacilli	Probably sarcoma
Mucopurulent, fœtid, bloody. Hæmoptysis			Examination of vomitus: portion of membrane, non-characteristic bacteria and one unmistakable hook	
No details	Yellowish, purulent fluid in right chest; right lung completely filled with purulent serum. Right bronchus compressed by enlarged bronchial glands, hard, yellow, and cheesy on section. Nodules in left lung. Numerous nodules in liver up to size of small apple. In both lungs along the larger and smaller bron-	Gastro-hepatic lymph nodes; numerous nodules in duodenum	Nodules composed of leucocytes, well developed embryonal cells, and less numerous spindle cells	Primary focus not to be determined; possibly in lung

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	CLINICAL SYMPTOMS
					œdœma of abdominal wall, some ascites. Puncture withdrew bloody serum and patient felt better, but physical signs remained the same. Liver becomes larger. Increasing dyspnœa; icterus. Death 4 weeks after admission. Duration about 2 months
13	LESIEUR ET ROME, Lyons Med., CXIII, July, 1909, p. 74 Cancer massif du Poumon, secondaire a un Cancer latent du Rectum	M	54	L	Cough for years; for 1½ years loss of flesh and strength. 3 months before entering hospital ceases work. On examination nothing found except dulness left base, diminished breathing, some mucous rales. Continued loss of weight, but nothing found to explain condition except the few signs on lungs. Nothing could be felt in rectum. Died 4 months after admission. During all this time the only lung symptoms were pain in left chest, dyspnœa, and persistent cough. Vocal fremitus preserved. X-ray showed extensive shadow at left base and immobility of left diaphragm
14	LÖHLEIN, Verhand. der Deutsch. Path. Gesellschaft, 1908, p. 111 Cystisch papillärer Lungentumor	F	69	R	Died of tubercular pericarditis
15	OGLE, CYRIL, Trans. London Path. Soc. Vol. XLVIII., 1897, p. 37	M	28	R	Cough and occasional hæmoptysis for 5 years intermittently. Physical signs suggest empyema; hectic type of fever. Death from profuse hæmoptysis
16	RUDISCH & SCHWARTZ, Mt. Sinai Hosp. Reports, 1903, p. 26 Primary Sarcoma of the Lung and Pleura	M	33	L	No heredity. Syphilis. Pain, loss of weight, hoarseness. Bulging of left chest. Dilated veins of upper extremities and chest. Flatness and absence of voice and breathing. Aspiration negative. Enlargement of lymph nodes, liver and spleen. Œdœma of face, left arm and chest. Increasing dyspnœa, fever up to 104, emaciation

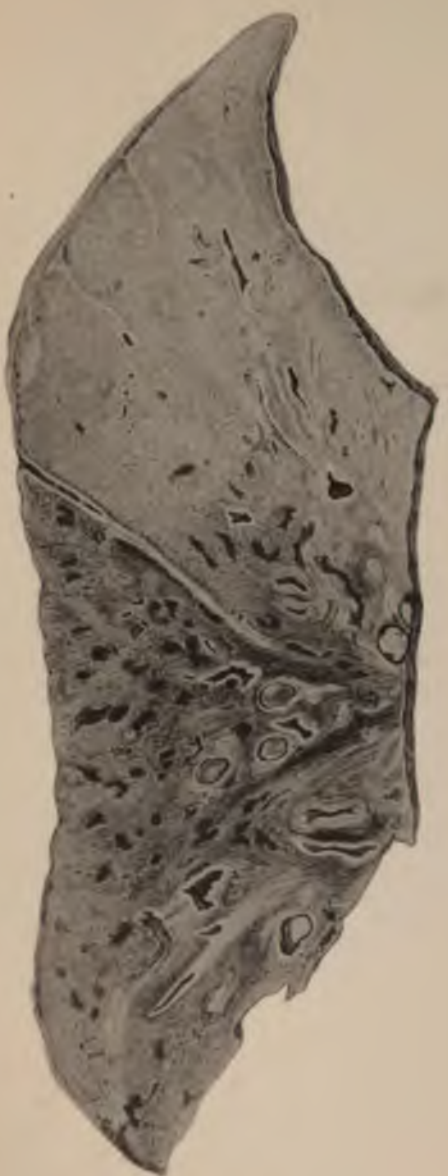
SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
	chi and scattered under pleura similar nodular foci			
At times sanguinolent, no tubercle bacilli. Mostly mucopurulent and scant. Hæmoptysis at various times	Massive tumor occupying nearly all of left lower lobe, only a very small strip of lung tissue persisting at base. Tumor broken down in places gives impression of primary tumor in lung. In rectal ampulla 6 cm from anus a carcinomatous ulcer evidently primary	In liver and under diaphragm. All other organs healthy	Tumor of lung consists of typical cylindrical celled carcinoma exactly like that of rectum	Only example of large massive secondary lung tumor. Author justly says that if autopsy had not been so carefully done, this case would undoubtedly have been classified as primary lung tumor. It is also remarkable that there were practically no symptoms of the rectal carcinoma
No details	Besides the tubercular lesions there was found a tumor the size of an apple in lower lobe containing cavities filled with mucus; strands and ramifying tracts of spongy tissue between them	No details	Papillary and cystic adenoma	Origin possibly from bronchial mucous glands
Profuse hæmoptysis. Offensive sputum suggested bronchiectatic dilatation	Cavity in lower lobe surrounded mainly by lung tissue communicates with left main bronchus — evidently a bronchiectatic cavity — offensive dark red contents. Pear-shaped flat masses of tissue roughly resembling skin and covered with hair protrude into this cavity. Several stalks are joined into one mass which can be traced beyond the cavity into the mediastinum to right of pericardial sac. Sac contains sebaceous matter, hairs 1½ inches long, and one large tooth	No details	The tongue-like projections have stratified epithelium covering fatty and fibrous tissue and having many sebaceous glands	Origin probably in mediastinum compressing bronchus, causing bronchiectatic cavity, and penetrating and growing in this
No details	Entire left chest and mediastinum filled with tumor. Heart dislocated to right. Large abscess in tumor containing putrid pus	Retroperitoneal lymph nodes	Simply stated that tumor is endothelioma	

NO.	AUTHOR	SEX	AGE	LUNG INVOLVED	REMARKS
17	SOMMERS, N. Y. Med. Record, LX, 1901, p. 475 Dermoid Tumor of the Lung	M	27	R	Died of chronic pulmonary phthisis. Both lungs tubercular and cavernous
18	SORMANI, Gazz. d. Osp., Milano, 1890, XI, p. 314–322 Di un Caso di Cisti Dermoide del Polmone sinistro	F	26	L	No heredity. Was first child; pregnancy and birth normal. As baby during first 4 months very susceptible to cold and exposure to open air. After lengthy nursing had to be held in upright position, as she was seized with strong attack of coughing and dyspnœa. Cough increased as she grew older; also dyspnœa; cyanosis of lips. In her 16th year hairs were noticed in her usually mucoid sputum; they were supposed to have been in food eaten and no further attention was paid to them. Some time later a whorl of black hair was expectorated. Phthisical habitus. Harassing cough and dyspnœa increased. Last two years of life in bed; the slightest movement, even turning, caused severe pain in chest and excessive dyspnœa. Could not eat for dyspnœa. Would not seek medical aid, saying there was no cure for a poor consumptive. Admitted to hospital July 17, 1887. Exact examination could not be made on account of moribund condition of the patient. Death several hours after admission

SPUTUM	AUTOPSY NOTES	METASTASES	MICROSCOPE	REMARKS
No details	Besides the tubercular condition a cystic body was found at apex of right lung containing large masses of hair and some "dentoid bodies"	No details	No details	
Mucoid, hairs	Left pleura adherent. On section of left lung yellowish gray creamy atheromatous material of nauseating odor and containing small brown hairs. Nearly the entire upper lobe and ¾ of lower converted into a large pouch the size of a new-born child's head, containing the atheromatous material. The wall of the cavity is firm and hard and does not communicate with a bronchus. There are many places covered with longer or shorter brown hair. In some places it resembles cutis covered with hair; there are also small spots resembling cartilage. There is a small cyst size of a nut above hilus, also a large one having the same structure and characteristics except that the hair is black. Right lung normal. Turbid serum in right pleura and pericardium		Wall of sac resembles cutis in structure with typical papillæ, hairs, epithelium, sebaceous glands, etc.	

PLATES

PLATE I



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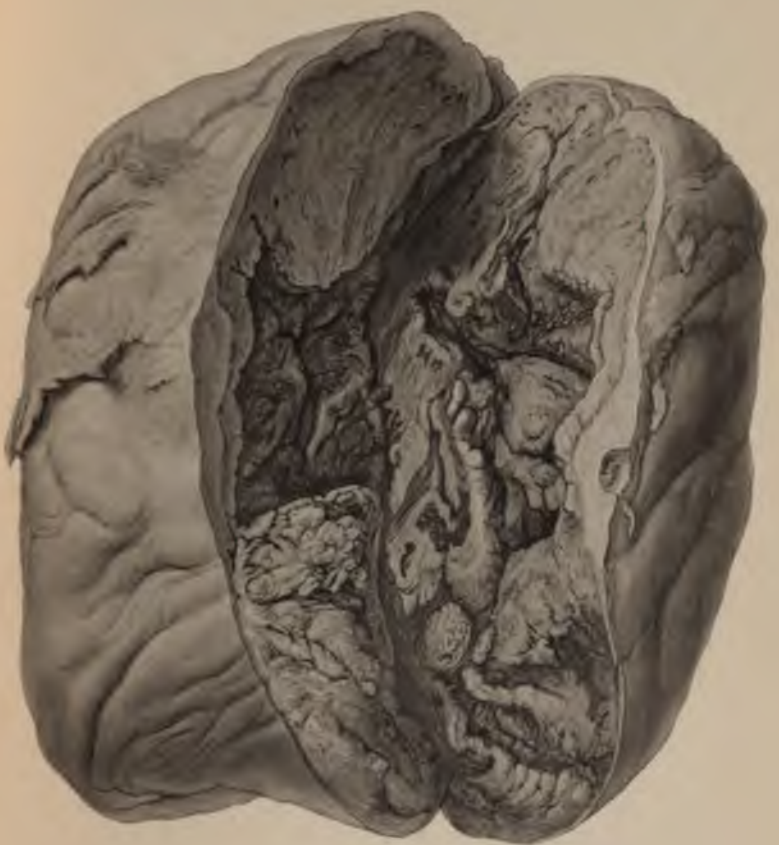

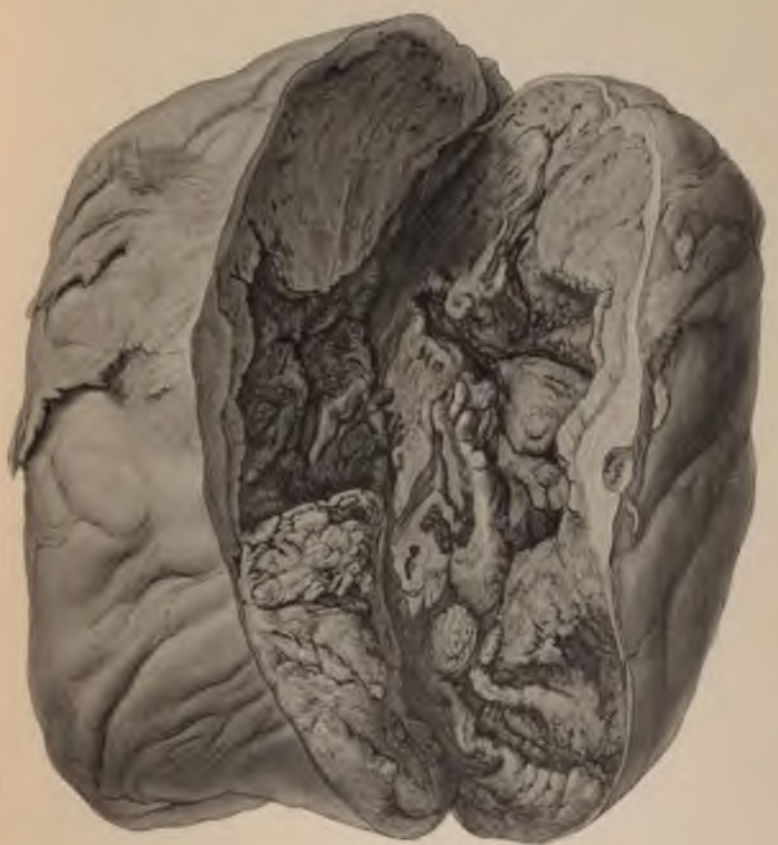

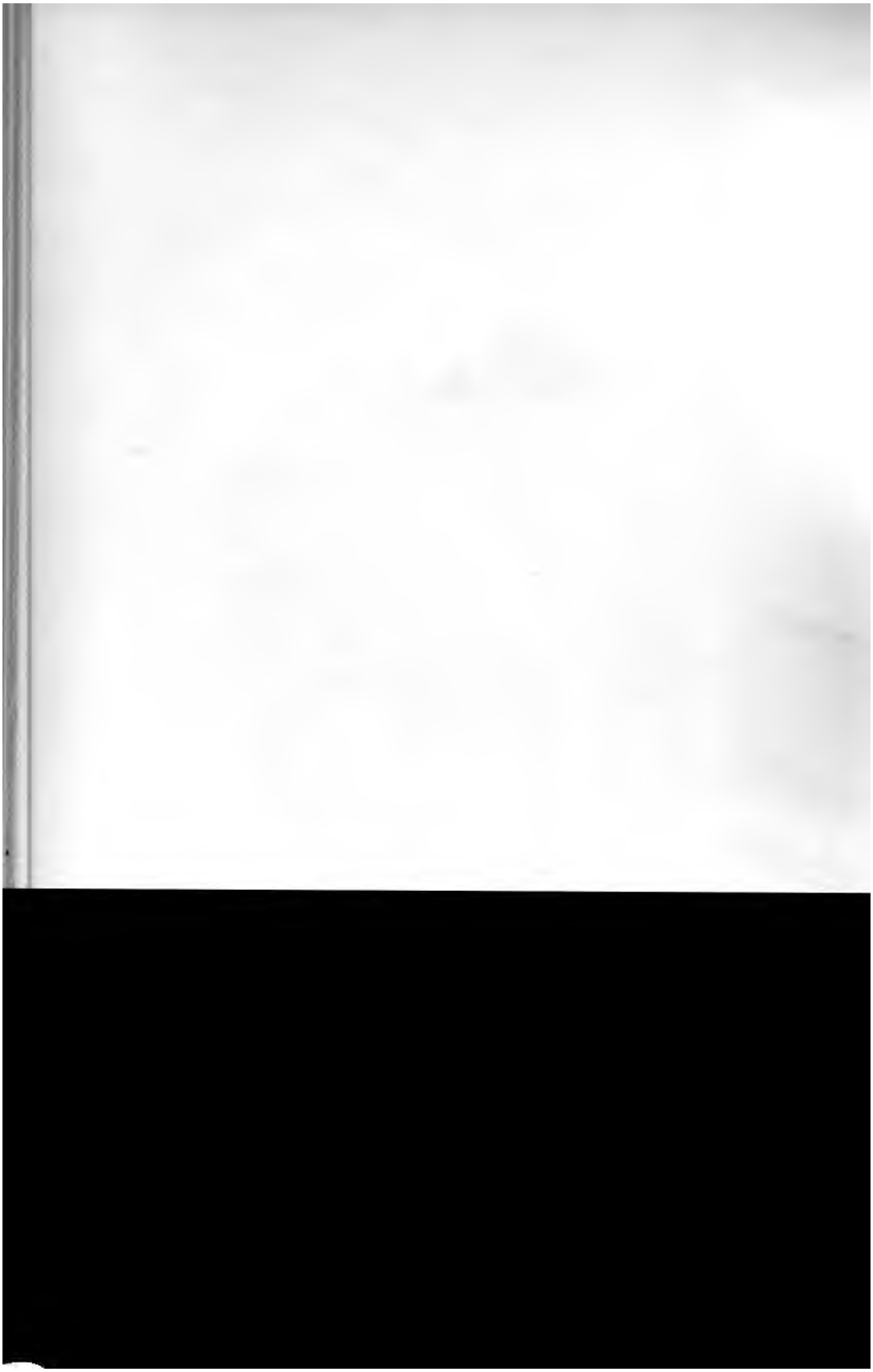

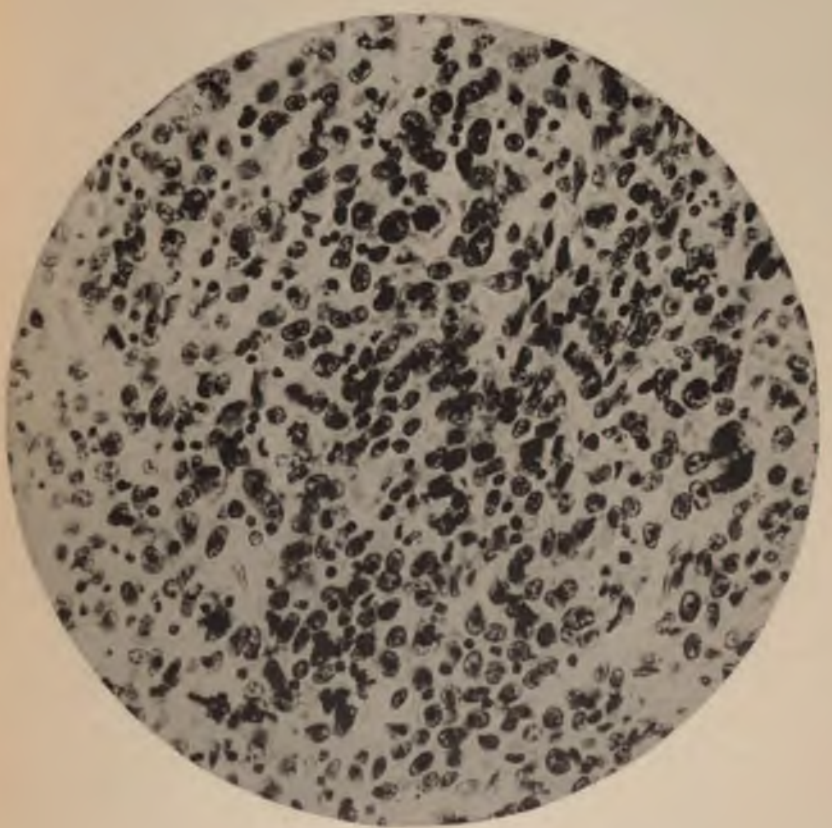

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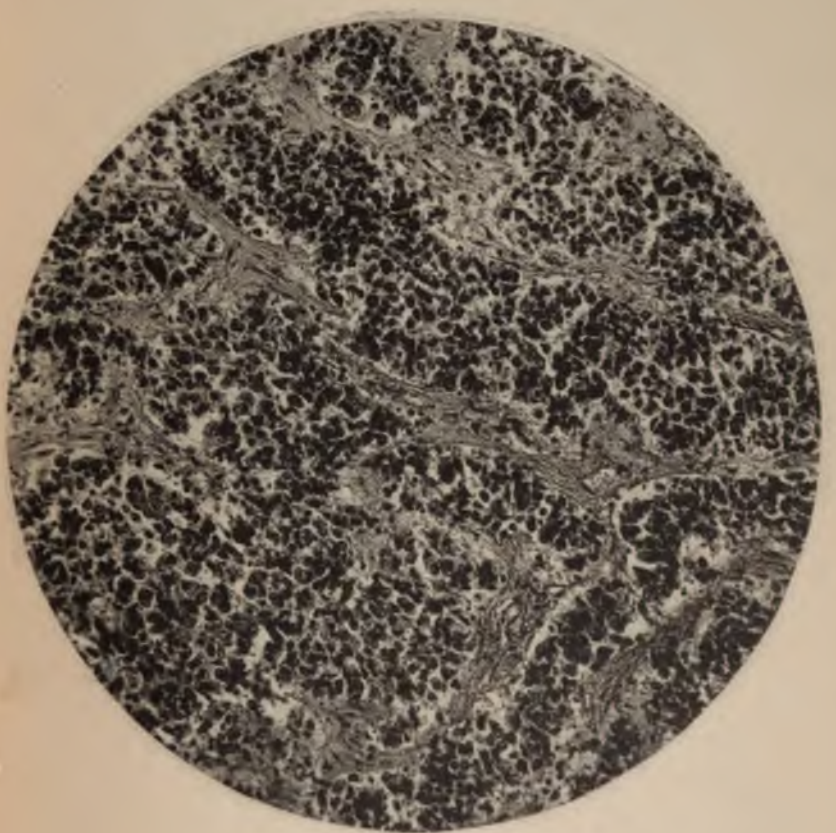
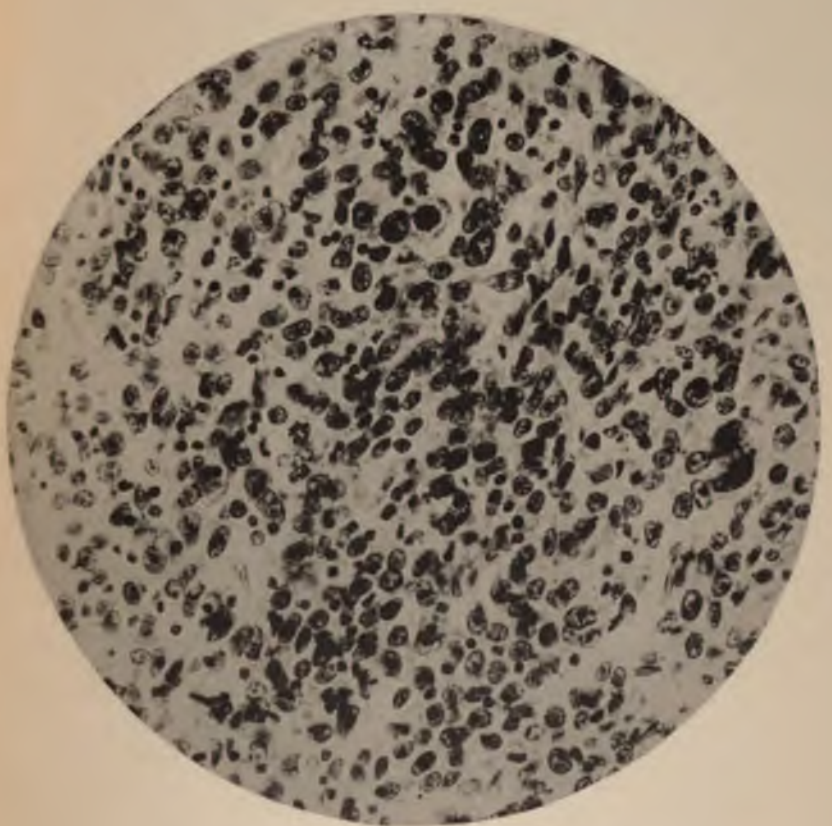


PLATE II

PLATE III



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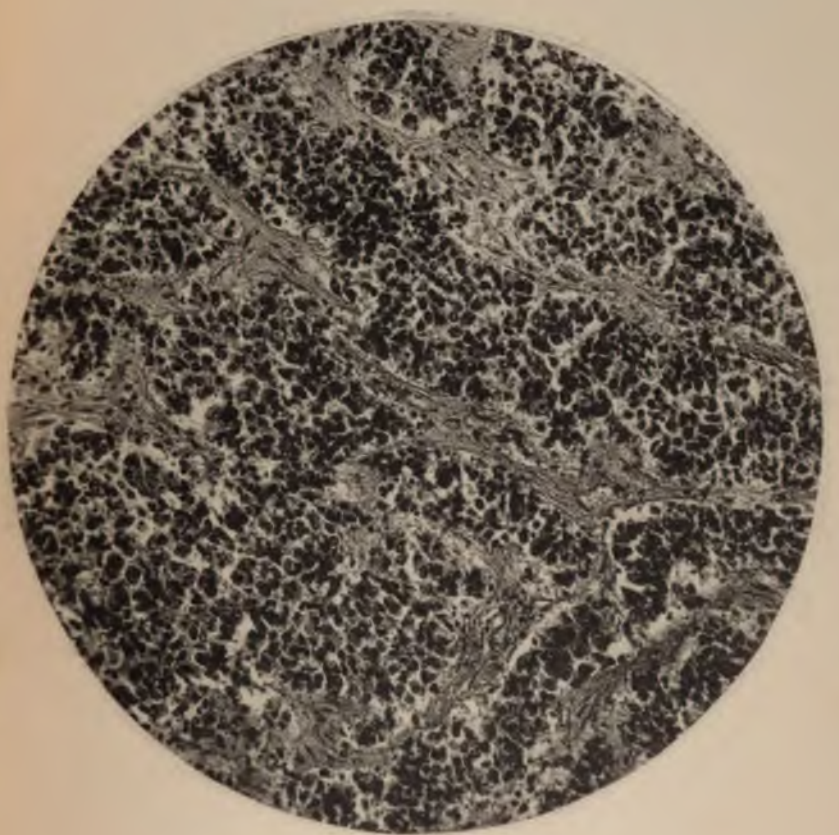
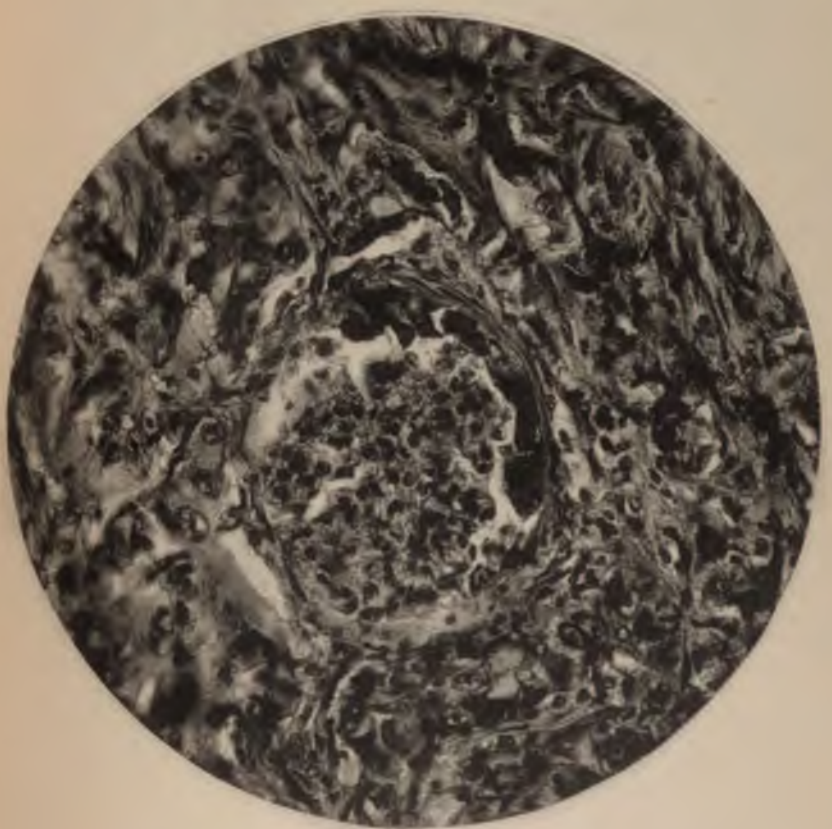




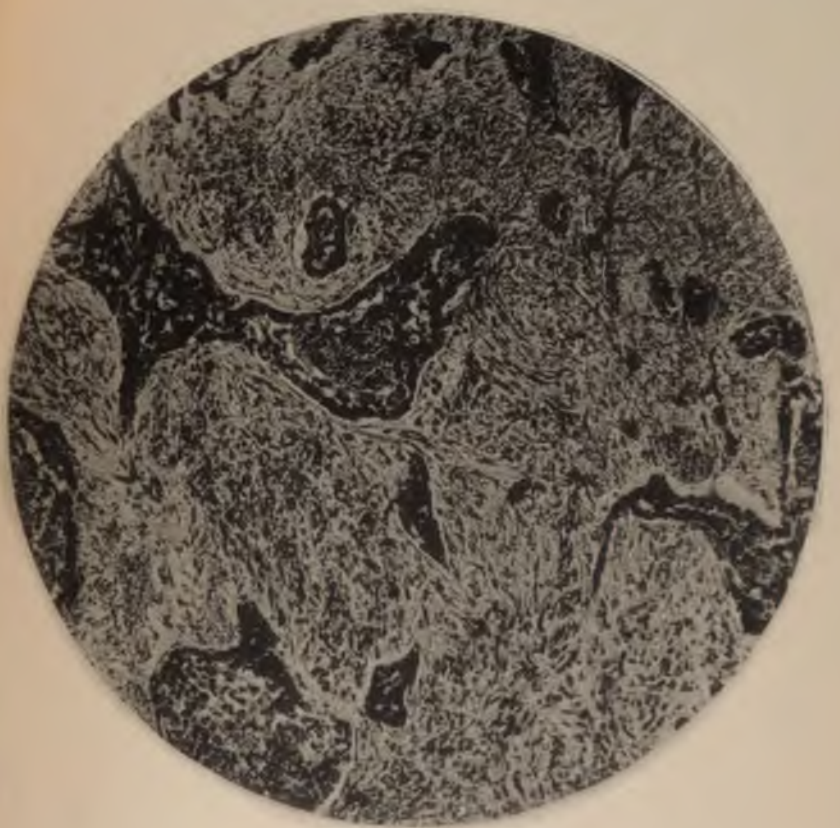


PLATE IX

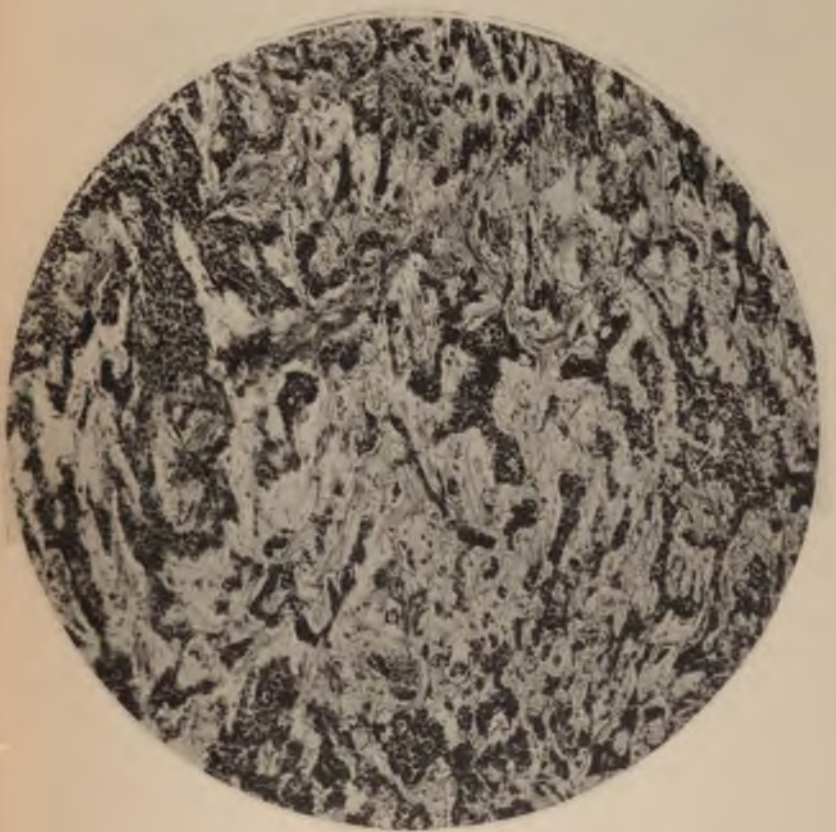
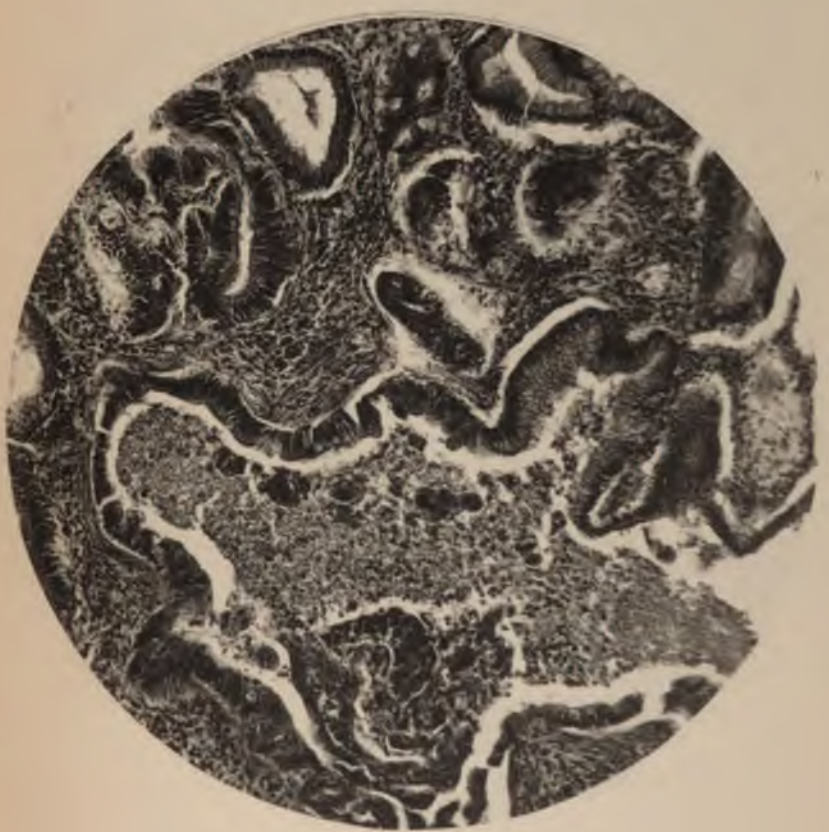
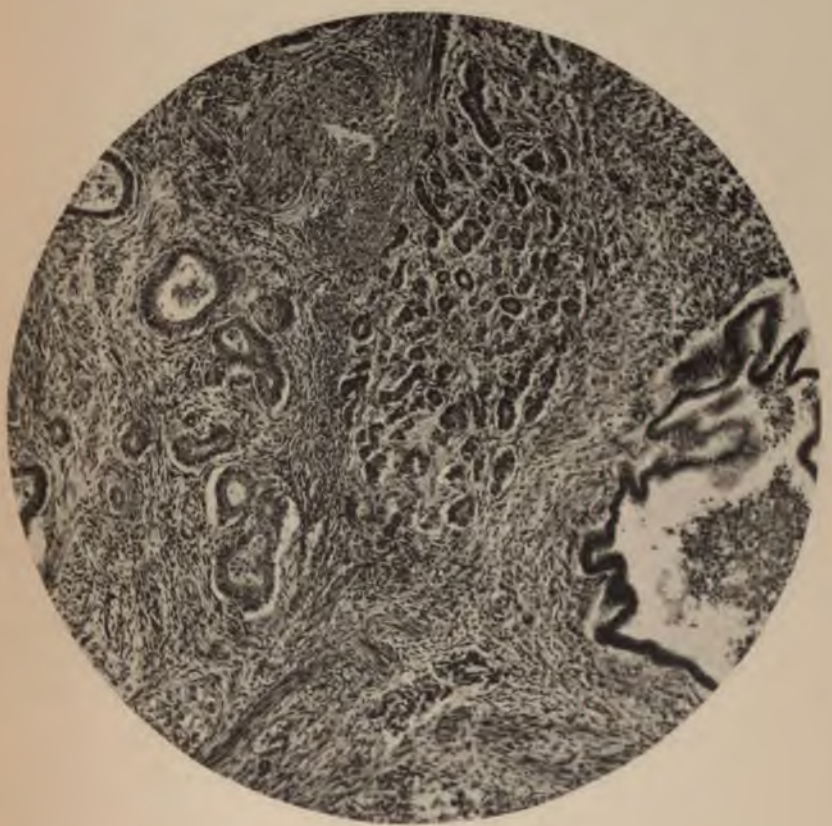
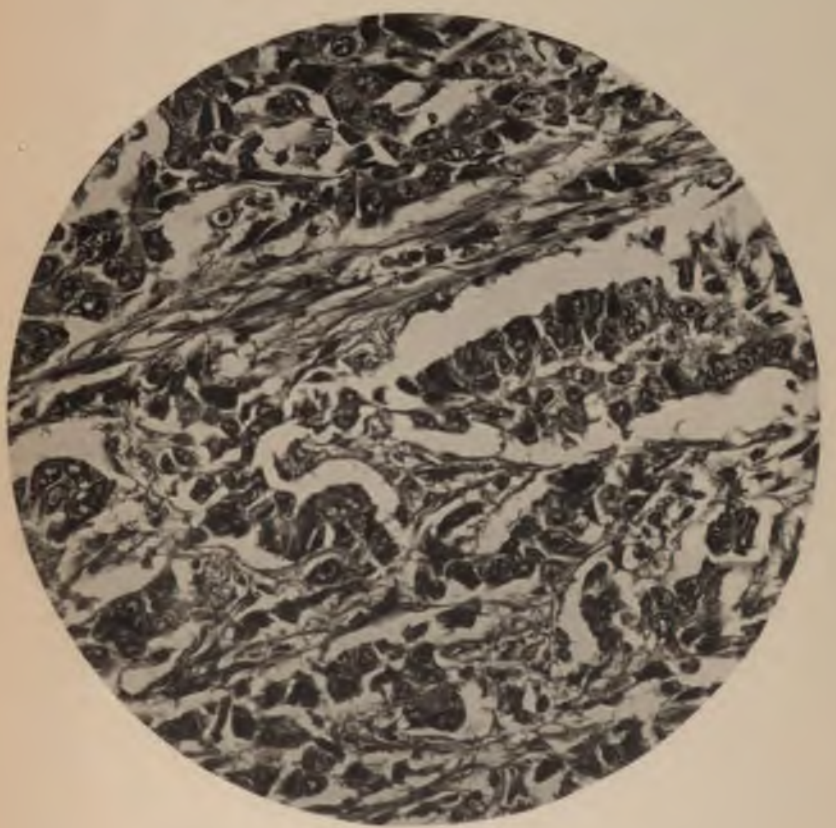


PLATE X

PLATE XI







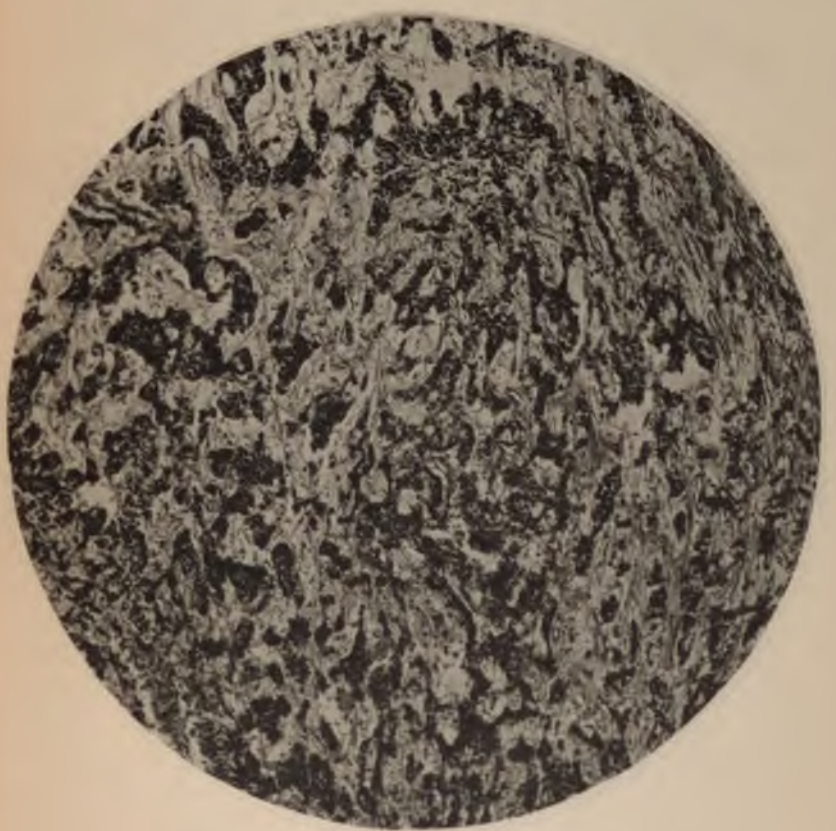
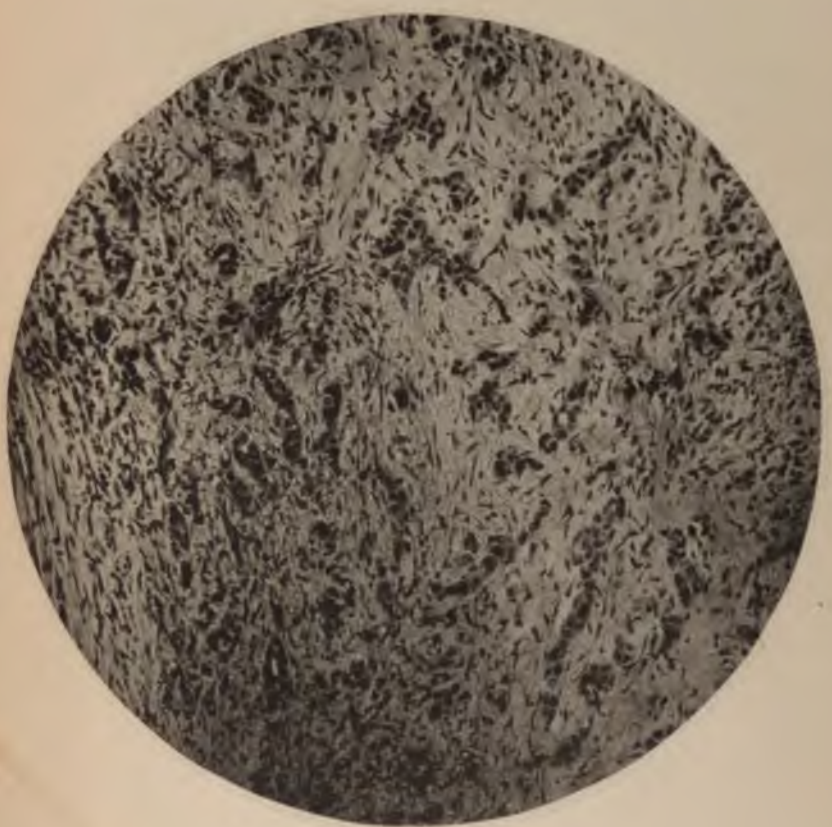


PLATE XVI



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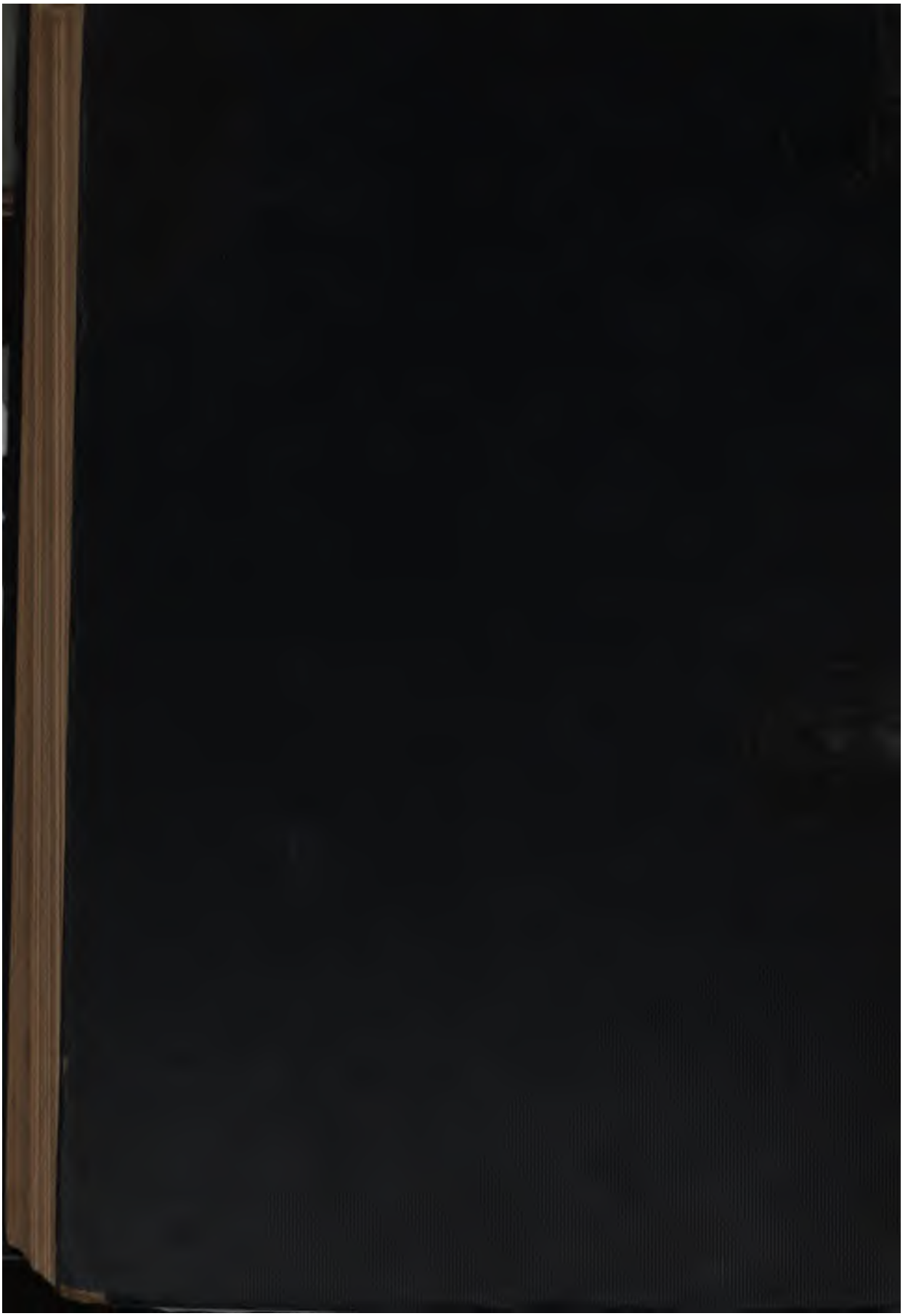
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